# NH Department of Environmental Services Waste Management Division

# Regulatory Barriers to the Implementation of Innovative Environmental Technologies

# January 1997

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them." Albert Einstein

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# **EXECUTIVE SUMMARY**

This report contains the results of a one-year effort by the New Hampshire Department of Environmental Services (DES) and stakeholders to examine DES practices that may inhibit the timely implementation of innovative environmental technologies and to propose solutions to those barriers. DES's purpose in eliminating barriers to innovation in environmental technologies is to become more effective at reaching the goal of a clean environment. DES recognizes that a thriving environmental business community is one of the most important tools that society has to accomplish this.

There are a few barriers to innovative technologies actually written into legislation and regulation. Most, but not all, of these barriers appear to be unintentional. Some of these barriers are absolute technology mandates or prohibitions, while some are requirements for demonstrated performance or public benefit that can inhibit the use of new technologies. The majority of barriers found in actual practice relate to communication. The language used by regulators can confuse business people, just as the language used by people marketing products can be mistrusted by regulators. Business people may not understand the needs of the regulators, as regulators may not understand the needs of the business community. Further, the often adversarial nature of the dealings between the regulator and the regulated party leads to a lack of trust which impedes open communication. Each communication breakdown increases the chances that a project will not be approved, and more importantly, built.

DES does not appear to have a fundamental problem with acceptance of innovation. The problems found in actual New Hampshire practice may be characterized as inefficiencies in the regulatory system rather than major break-downs. They are:

- Getting the Right Information to the Right People
- Lack of Verified Performance Data
- Government Administration
- Barriers Written Into Laws or Regulations
- Risk Aversion

Recommendations are made in the report to enhance services to DES's customers in the following areas:

- Assistance to outside parties making applications to DES.
- Improving DES's ability to evaluate innovative proposals.
- Finding ways to make the laws and regulations better serve DES's goals.
- Offer alternative or secondary pathways to use of innovative technologies.

Together with DES's Small Business Technical Assistance and Pollution Prevention Programs, the recommendations in this report will allow DES to offer a full range of assistance services to its customers. DES expects that implementing these recommendations will benefit the environment of New Hampshire, by ensuring that the best available solutions are brought to bear on existing problems, and to prevent new problems from arising. Additionally, New Hampshire's business community should benefit both by allowing new products to come into the environmental market, and by lessening their environmental liabilities through the use of the best available methods. In both ways, the citizens and the environment of New Hampshire benefit.

#### 1. INTRODUCTION

# 1.1 Statement of the Issue

The mission of the New Hampshire Department of Environmental Services (DES), is to protect, maintain and enhance environmental quality in New Hampshire. (1)

The *DES Strategic Plan* includes many goals and objectives which describes how DES intends to fulfill this mission. Goal Number 7 is especially relevant to this report:

# "To encourage innovation and new ideas."

It has been suggested that the environmental regulation system has created unnecessary barriers which impede or inhibit the use of innovative technologies. The use of "innovative technologies", new and better technological solutions to our environmental problems, may result in a more environmentally effective and/or cost effective way of addressing an environmental problem. In order to achieve DES' goal regarding innovative technologies, it is necessary to identify what barriers actually exist and determine how to overcome them.

The goal of this report is to identify what inappropriate barriers exist in DES practices that inhibit the timely implementation of innovative environmental technologies and to propose solutions to those barriers.

The term "inappropriate" is included because DES must preserve the appropriate barriers. "Appropriate" barriers are those that act to prevent poorly-conceived projects from being built. Over the years, careful processes have been put in place to review various applications with environmental impact. The purpose of these processes is to protect public health and the environment, and to help ensure that the matter being applied for is constructable and has the best possible probability of working as intended. Where public funds are involved, economic efficiency must also be considered. DES believes these purposes are valid, and help protect the public.

There is a general perception in the environmental industrial and professional community that government environmental agencies impede the implementation of innovative environmental technologies. Commercialization of new technologies of any sort is difficult at best. While this report focusses on DES practices, government is only one part of the complex system of commercialization of new technologies. The complex array of environmental legislation and regulation at the federal, state and local levels contains barriers, intentional and unintentional, to efficiently implementing new, better, technologies. Internal policies and procedures and management structures can add to the difficulty of getting a new technology approved and working.

DES is faced with conflicting needs regarding innovative environmental technologies. The need for better solutions must be balanced against the need for sure solutions. Innovation is a trail-and-error process by its nature. Where errors are not allowed to occur, there will be no innovation. Where there are failures, the public will rightly take the regulators to task. Finding a balance is the challenge.

The need for innovative technologies varies from program to program. In some programs, the standard engineering solutions work acceptably, and innovative solutions offer incremental improvements. In other programs, such as contaminated site clean-up, the standard solutions do not always work acceptably and there is much more pressure for innovation. In all cases, there is always pressure to lower costs.

DES's purpose in eliminating barriers to innovation in environmental technologies is to become more effective than we are at present at reaching the goal of a clean environment. DES recognizes that a thriving environmental business community is one of the most important tools that society has to accomplish this. Therefore, the purpose of eliminating barriers to innovation is to free the private sector from unnecessary and inappropriate impediments to discovering and implementing new effective environmental technologies.

# 1.2 Work Progress

A major part of the effort to identify inappropriate barriers to innovative technologies was an effort to obtain DES' customers' point of view. To accomplish this, an advisory committee of stakeholders was assembled, called the DES Innovative Technology Committee. This is a group of people who volunteered to support this project from organizations representing the consulting community, academia, municipalities, the legal community, and non-governmental (i.e. public-interest) groups. Members of the IT Committee are listed in Table 1. The IT Committee met nine times during the preparation of this report. Problems were brain stormed, both in terms of actual cases and in conceptual terms. Case studies were examined using cases that arose out of an internal DES survey. The DES innovative Technology (IT) Committee met eight times between February and October, 1996. Discussions at these meetings ranged from describing actual experiences with regulatory barriers to innovations, to far-ranging conceptual issues.

As noted above, DES supervisory staff was surveyed. The survey memo described the Innovative Technology Barriers project, and asked for their input. To initially frame the questions surrounding regulatory approval of innovative technologies, a list of categories of barriers was attached. This list was taken from a report prepared by DES in January 1995 titled *Barriers to Pollution Prevention Within a Regulatory Agency*, somewhat modified to reflect the new subject. A copy of the survey memo is attached to this report as Appendix B.

To find out what problems other agencies in the region may have had with regulatory approval of innovative technologies, and what processes they might have specifically addressing innovative technologies, contacts were made with other New England states. These contacts were made through existing regional inter-government associations: the New England Interstate Water Pollution Control Commission (NEIWPCC) for water-related issues; the Northeast States for Coordinated Air Use Management (NESCAUM) for air-related issues; and the Northeast Waste Management Officials Association (NEWMOA) for waste-related issues.

Literature on the subject of government acceptance of innovative technologies was researched.

The information gathered from all these sources is summarized in Chapter 3, and is reflected in the discussion of issues in Chapter 2.

Table 1
Members of the DES Innovative Technology Committee
In random order

T. Taylor Eighmy	University of New Hampshire	
David Borowy	Environmental Business Council - N.E.	
David Bass	Environmental Business Council - N.E.	
Pamela Hall	Environmental Business Council - N.E.	
Peter McGlew	NH Business & Industry Association	
Victoria Jas	NH Business & Industry Association	
Paul Casey	New England Water Environment Association	
Richard Levergood	NH Department of Environmental Services	
David Allain	Granite State Designers & Installers Association	
William Daly	NH Water Works Association	
Michael Quinn	NH Bar Association	
Kenneth Kimball	Appalachian Mountain Club	
Rep. Cynthia McGovern	NH House Science & Technology Committee	
Rep. H. Chandler Royce	NH House - Resources, Rec'n & Dev'nt Comm.	
Sen. Carl Johnson	NH Senate Economic Development Committee	
Robert Minicucci	NH Department of Environmental Services (Coordinator)	

# 1.3 Summary of Results and Recommendations

There are a few explicit barriers to innovative technologies actually written into legislation and regulation. Most, but not all, of these barriers appear to be unintentional. Some of these barriers are absolute technology mandates or prohibitions, while some are requirements for demonstrated performance or public benefit that can make it difficult to use new technologies in the field. Additionally, the complex interactions within and between the State and Federal waste management regulations tend to act as dis-incentives to employment of innovative methods in this field.

Based on the information received by DES from various stakeholders, DES does not appear to have a fundamental problem with acceptance of innovation. The problems appeared to be project-specific and were based in details. These problems may be characterized as inefficiencies in the overall environmental regulatory system rather than major break-downs in the system. The majority of barriers found in actual practice relate to communication and administrative practices. The language used by regulators sometimes confuses business people. The language being used by people marketing products is sometimes mistrusted by regulators. The language used by the legal and engineering communities is not always understood by people outside those professions. Business people may not understand the needs and responsibilities of the other parties in the other professions, as regulators may not understand the needs of the business community.

Further, the often adversarial nature of the dealings between the regulator and the regulated party leads to a lack of trust which impedes full and frank communication. While DES tries to work in a non-adversarial manner, if any one of the parties working on a problem takes an adversarial stance, cooperative problem solving becomes very difficult. Each communication breakdown increases the probability that a project, especially one involving an innovative technology, will not be approved, and

more importantly, built. Addressing these communications and administrative problems requires more subtle solutions than the problems that are in laws and regulations.

Federal and State laws and regulations have been generally written to establish a "command-and-control" structure. Programs with this structure have successfully addressed many problems, but the appropriateness of the command-and-control structure to current problems is being questioned. DES is moving toward performance-based regulatory systems. However, many parties outside government agencies prefer the more rigid structure so that they know exactly what their expectations can or should be. Many parties would rather deal with prescriptive requirements than deal with the uncertainty that performance-based or other regulatory frameworks can present.

There is some demand for DES to provide review and approval of technologies. The current regulatory system in New Hampshire does not allow DES to do this, with the exception of on-site wastewater disposal. It is not necessary at this time, however, to begin a new program to meet this demand, as similar services are available elsewhere. A major focus of the recommendations in this report is facilitating contact between parties who need information or assistance with new technologies and the parties who can provide that information or assistance. Credible data describing the performance of a technology is a key need, but it appears that in many cases communication of existing data is not done.

DES recommends enhancing its practices to ensure that government practice will not impede regulatory acceptance of innovative technologies in the following ways (See Chapter 6 for a more complete discussion of these recommendations.):

# 1. DES should continue to encourage innovative technologies.

DES's *Strategic Plan*, lessons learned from this project, and DES advocacy for innovative solutions to address problems such as the Somersworth Landfill indicate that DES generally has a positive attitude toward innovative approaches to environmental protection. DES feels that this will be a significant advantage for New Hampshire since it will both encourage more technology-based firms to do work and prosper in New Hampshire, and result in solutions to environmental problems that are more cost effective and/or more environmentally effective.

# 2. DES should provide some new, or augmented, services to its customers.

Staff functions to improve services to its customers and to improve the acceptance of innovative environmental technologies can be divided into three categories: assistance to outside parties making applications to DES; assistance to DES staff in evaluating these proposals; and, in a time when the pace of technological change is faster than the pace of legislation and rule-making, finding ways to either make the body of laws and regulations serve the public better by supporting DES's goals or changing those laws and regulations to make this so. These services should be coordinated closely with DES's existing Pollution Prevention and Small Business Technical Assistance programs.

# 3. DES should make increased efforts to secure flexibility in application of federal regulations and national programs.

Regulations and guidelines written for the national scale can not anticipate all variations in circumstances or technological change. However, DES's authority to interpret Federal guidance to address New Hampshire's unique problems is limited. DES is currently working with EPA and other states to implement this improvements in this area, and DES should continue to make every effort to

secure the needed flexibility to address New Hampshire's problems in the most efficient and environmentally protective way. Methods of accomplishing this include the new "Performance Partnership" arrangement with EPA, and/or expanding the use of "Enhanced Environmental Performance Agreements," as defined in RSA 125-C:6-a, to include projects regulated under DES's waste and water programs.

# 4. DES should use the state rule-making process most effectively to avoid unnecessary limits on the exercise of professional judgment.

The current state rule-making process can require excessive specificity in definition of terms and conditions, limiting DES's ability to respond to changing conditions and new problems and solutions. Solutions are available, however,

which can be used more broadly. The use of "functional equivalency" in the current New Hampshire Solid Waste rules is an example of the type of concept that can be used in administrative rules to allow proper use of professional judgment.

# 5. DES needs to ensure that staff, regardless of funding source, have access to technical training to keep abreast of new methods in their field.

A greater effort should be made to ensure that staff has the means to keep abreast of technical developments in their fields, as called for in Objective No. 7-4 of the *Strategic Plan*. State-funded programs, as well as federally-funded ones should include training costs in their budget.

# **6. DES** should continue to support changes in federal hazardous waste regulations.

The United States Environmental Protection Agency (EPA) is currently considering several changes to the framework of hazardous waste regulation. Proposed changes to the Hazardous Waste Identification Rule, and the proposed Contaminated Media rule, among others, should have the effect of allowing new industrial and site clean-up technologies to be used in a field where the conventional technologies are not adequately meeting environmental goals. DES has supported these changes, and should continue to do so.

# 7. DES should continue to support and participate in existing and future inter-state efforts to improve acceptance of innovative technologies.

DES is currently participating in several interstate efforts being managed by EPA and other organizations, such as the New England Governors' Conference in on-site wastewater disposal and the Association of State Drinking Water Administrators in the field of drinking water treatment. DES should participate in similar efforts, such as the Western Governors' Association's (WGA) Interstate Technology & Regulatory Cooperation Work Group, working in the field of hazardous waste clean-up. DES should continue to enter reciprocal agreements with other States' agencies where appropriate.

# 8. Means should be found to allow DES to hire outside experts on an ad hoc basis to help DES evaluate innovative applications, where this is mutually acceptable to DES and the applicant.

While some innovative technology applications are simple, others are quite complex. For the more complex cases, DES sometimes finds it necessary to seek advice on innovative technologies from outside the agency. If this can not be done, DES staff is faced with the choice of approving an

application that staff does not understand, or rejecting it. Use of an independent expert, paid for by the applicant but working for DES, could be an effective way to get necessary information. The University of New Hampshire can possibly also help to meet this need.

# 9. The existing DES Innovative Technology Committee should be retained to advise DES on technology matters.

The Innovative Technology Committee has been very helpful in assisting DES in identifying actual barriers to innovative technologies. The IT Committee can fill an on-going role by serving as a sounding board for DES staff and applicants, and by providing DES an increased knowledge base and advisory opinions on technology-related applications where DES staff is unfamiliar with the proposed technology or where there are concerns about the risks posed by possible failure of the proposed technology. The IT Committee could also be a resource for applicants to DES, to review DES decisions where applicants feel that a proposal has not received a fair hearing.

# 10. DES should establish an explicit network of staff experts in specific technical fields to act as internal consultants.

Currently, individual staff people rely on their own personal knowledge and the knowledge of their immediate supervisors and other people they work regularly with. The total DES community of about 440 people represents a far wider knowledge base than this. Many staff people have knowledge and experience in areas not reflected in their current title or job duties. Having an established list of internal experts and a means of referral to those experts will help ensure that staff have the best possible access to the knowledge base of the entire DES staff when it is needed to review applications that involve unfamiliar technological methods. This recommendations, together with Numbers 2, 8, and 9, will provide a full spectrum of assistance possibilities for DES staff and customers.

# 11. DES should establish a database of innovative technologies.

A technology database would serve two classes of customers: first, DES staff could use this proposed database to learn where, or if, a proposed technology has been used in the past either to answer questions from the public or to assist the review of an application; and second, interested parties outside DES - the consulting and business communities and the general public - could use this database to learn about the existence, applicability, and (where appropriate) regulatory status of technologies to help them address problems that they face. Fact sheets for staff or public use can be produced easily from such a database. Support by other agencies in this effort, either in the New England area or nationally, should be pursued. The most likely form this effort will take is DES use of existing, or recently proposed, technology databases.

Staff resources will be needed to implement each of these recommendations. This could be accomplished either by establishing a full-time coordinator position, by integrating these functions at the Division or program level, or both. DES expects that implementation of these recommendations will benefit the environment of New Hampshire by ensuring that the best available solutions are brought to bear on existing problems, and to prevent new problems from arising. Additionally, New Hampshire's business community should benefit by allowing new products to come into the environmental market, and by lessening their environmental liabilities through the use of the best available methods. In both ways, the citizens of New Hampshire benefit.

#### 2. DISCUSSION

#### 2.1 The Need for New Technologies

#### **2.1.1** New Hampshire's Strategic Goals

We have certainly not solved all the environmental problems facing modern society. While the environmental movement, and the government programs and private sector efforts spawned by that movement, have accomplished great things over the past several decades, there is much more to do. Further, it appears that the problems already addressed, e.g. the discharge of raw wastes to rivers and the open burning of solid waste, are the easier problems to solve. Finding solutions for issues such as regional air quality, non-point-source water pollution, and uncontrolled hazardous waste sites, within limited budgets, while respecting property and individual rights, presents subtle and difficult problems. There is also a limit to what cost society is prepared to bear to reach the goal of a clean environment. Establishing where this limit actually lies is beyond the scope of this report, but this limit does exist. Some of the solutions to these problems will be technological, others will not.

Therefore, more effective technologies for the prevention and treatment of environmental contamination are necessary to solve complex environmental problems in a cost and environmentally effective manner.

In preparing its *Strategic Plan* in 1994, DES recognized this need. The mission statement in the *Strategic Plan* is also the guiding principle behind this report:

The mission of the Department of Environmental Services is to protect, maintain and enhance environmental quality in New Hampshire.

The *Strategic Plan* includes many goals and objectives which describes how DES intends to fulfill this mission. Goal 7 and two of the objectives associated with it are especially relevant to this report, and are quoted here:

# Goal #7: To encourage innovation and new ideas.

**Objective #7-2** Identify, in cooperation with the consulting community and others, barriers to the application of innovative approaches.

**Objective #7-4** Provide opportunities for department employees to participate in education/training sessions on new and emerging technologies and approaches.

Another point to express about DES and its strategic goals is that DES is not exclusively a regulatory agency. DES is an **environmental** agency. Regulations are one of the tools that DES uses to reach its goals. Education and other outreach activities are important other means that DES uses to reach its goals. A better educated public and regulated community results in better protection for, and less harm to, the environment at less cost to the State. DES's non-regulatory programs such as the Pollution Prevention program have shown significant success in enhancing New Hampshire's environment.

It should be remembered that innovative technologies, as a class, are by nature somewhat more prone to failure than conventional technologies. The risk of failure must be balanced against the cost of failure. In addition to the need to find new and better ways to solve the problems we now face, we must recognize that as society moves forward new problems will arise. We must be prepared to effectively address new problems with the best possible solutions.

# **2.1.2** Differences in Need in Different Programs

In the overall sense, there are varying needs for new and innovative technologies in different environmental programs. The need for innovative technologies is related, in general, to the perceived degree of success of conventional technologies in achieving environmental goals. Where conventional technologies are not meeting the societal need for efficient environmental performance, pressure for innovation grows.

On the other hand, where standard technologies are working acceptably well, little pressure for innovation appears. An example of this is treatment of municipal wastewater. Where so-called "secondary" treatment is being used, there is usually little pressure for the use of innovative technology to achieve greater environmental protection. Where pressure exists, it is motivated primarily by a desire for cost savings or by entrepenurial initiatives.

This is not to say that all parties are satisfied at all times with the performance of standard technologies. Problems do sometimes arise. An interesting example from the last few years is a problem regarding nitrates from municipal wastewater treatment plants in Connecticut adversely impacting Long Island Sound. In this case, it was shown that the level of nitrates in treated municipal wastewater was leading to significant volumes of Long Island Sound becoming anoxic for part of each year, causing severe marine ecological impacts. Public acknowledgment of the problem's importance led to expenditure of public money to address the problem via adding innovative treatment units at existing municipal treatment plants<sup>(2)</sup>.

In programs where there is more need for innovation, there tends also to be a perception of higher barriers impeding innovation. There are several possible explanations for this. These programs tend to cover environmental problems that are newer to society and are less well understood. The costs and consequences of various courses of action are not as well understood. Therefore, these problems are perceived more emotionally by the public than problems that are better understood while at the same time they are approached more conservatively by regulators. Environmental industry sees the need for better products - a new market - and moves in.

Even assuming good intentions by all parties, conflicts can still arise. For instance the developer of an innovative technology **knows** that his or her method works perfectly well, and also has a need to keep the details of the process confidential to protect the business. The regulator has a responsibility to protect public health and the environment, and therefore needs both a certain level of proof that the technology will work adequately well and an understanding of the details of the process so that the consequences of the use of a technology can be adequately understood. These consequences can include handling and disposal of by-products, cross-media transfer of contaminants, and long-term maintenance requirements, that are sometimes missed by the developer in his or her zeal to market the product.

It should be noted that a technology developer must have this zeal and faith in the product, or the product will not reach the market. In any field, it is not true that a better product sells itself. It takes an enormous amount of work to commercialize any new product whether in the environmental field or not. (3)

From DES's point of view specifically, DES is a financial partner in Superfund cleanups, landfill closures, wastewater treatment plant upgrades, filtration of drinking water supplies, and cleanup of petroleum contaminated sites. For these programs, DES can save money for the State or do more with the same amount of money if DES is successful in encouraging innovation. In all programs, including

those where DES is not a financial partner, encouraging innovation may result in more permanent or more effective solutions.

# 2.2 The Problem Statement and Assumptions Underlying It

Following initial research and discussions within DES, the general problem of regulatory barriers to innovative environmental technologies was defined as follows:

What inappropriate barriers exist in regulatory practices that inhibit the timely implementation of innovative environmental technologies?

DES adopted the following definitions in support of this problem statement:

**Innovative:** Something that is either new and/or unfamiliar to the reviewer.

**Environmental Technology:** Includes methods, practices, machinery, test methods, software, services, etc. In this report, this term is being interpreted very broadly, and is not limited to so-called high-technology.

**Regulatory:** Related to policies, regulations, and their application or other constraint leading to a government office taking one action over another.

**Barriers:** Real and/or perceived problems that tend to prevent something from happening or to make a regulatory process slower than optimal.

**Inappropriate:** The term "inappropriate" is included in the problem statement because DES must preserve the appropriate barriers. "Appropriate" barriers are those that act to prevent poorly-conceived projects from being built. Over the years, careful processes have been put in place to review various applications with environmental impact. The purpose of these processes is to protect public health and the environment, and to help ensure that the matter being applied for is constructable and has the best possible probability of working as intended. Where public funds are involved, economic efficiency must also be considered. These purposes are valid, and help protect the public.

Other assumptions or findings underlying this report and the problem statement above include:

- The environment is not being protected to everyone's satisfaction.
- DES's processes are not perfect, therefore there always is room for improvement.
- There is a perception in the environmental business community that government is not sufficiently open to accepting innovative technologies and methods.
- Conversely, there is a perception in government that not all technology developers have a strong environmental ethic.
- The ultimate reason for government agency activity is to accomplish certain goals set by society. Where these goals are not sufficiently well met, the regulatory structure eventually is changed.
- People from companies, from towns, as individuals approach DES because a problem needs to

be solved. It is in all parties' best interest to solve the problem as efficiently as possible, within the framework of the laws.

• DES does not control every aspect, and in some cases very few aspects, of an environmentally regulated situation. Local and federal agencies are important players.

# 2.3 Customers

### **2.3.1** Who is the Regulator's Customer?

DES is trying continuously to improve its performance. To adequately evaluate that performance, it is necessary to define what people or entities DES's operations provide value to, that is, who are DES's customers?

DES customers include: the public at large; individuals; the business community; non-government citizen groups; municipalities; the federal government, especially EPA; the governor; and the state legislature. The environment of New Hampshire can be considered as a customer in that DES takes actions to affect environmental quality.

In the context of approvals of innovative technologies, this list can be narrowed down somewhat. Only three of the parties listed above approach DES asking for approval of technologies: municipalities, the business community, and individuals. Other parties may comment on, or advocate for, a specific proposal or even have veto authority, but these are the parties that actually approach DES with problems and possible technological solutions for them.

For each of these three classes of customers that will be considered more fully in this section, it is important to remember that their environmental problems and the effects of poorly-chosen solutions to those problems can have negative consequences that reach far beyond the customer's own property or jurisdiction. These consequences will impact DES's "ultimate" customers, the public and the environment.

# **2.3.2** The Municipality as Customer

Cities and towns approach DES seeking approval of proposed solutions to certain problems, usually in water supply, wastewater treatment and disposal, and disposition of the municipality's solid and hazardous waste. Air quality usually becomes an issue as it relates to a proposal in one of the other fields.

These problems almost always have great potential public health and environmental impact, which often extends beyond the municipality itself. This is one reason for careful state and federal oversight of these matters. Most often, municipalities address these problems in reaction to requirements placed on them by state or federal agencies. Most often, these problems have very large impact on the budget of the municipality.

The need to address these environmental protection issues, expressed as regulatory requirements, is not always adequately communicated. However, sometimes the need is simply not accepted by the municipality despite compelling evidence. The character of New Hampshire's (and probably most other places) local politics is that requirements imposed from above are often resented. Additionally, the

municipal government must balance the available funds against the various pressing needs it faces - schooling, public safety, transportation infrastructure, the industrial/commercial job-supporting base, and environmental needs. Environmental needs will not always get first priority.

In New Hampshire, the vast majority of the municipalities are small towns, who are quite proud of their "Yankee independence". Small towns have certain characteristics that make it more difficult for them to deal with regulatory requirements. Elected officials most often do not serve full-time. Small towns have few or no professional staff to interpret regulatory requirements. The operating personnel serving a small town may have less expertise in technical matters, and are very often only part-time employees. Therefore, the resources available to the small town to even understand, much less respond to, regulatory requirements is lacking. Enforcement efforts by the larger government bodies to compel compliance are often shifted into the political arena, if only because the small town sees no other way.

Addressing the environmental problems faced by municipalities requires capital improvements to their infrastructure. In this, the economies of scale work against the small town. The cost of a 150,000 gallon-per-day (gpd) sewage treatment plant is **not** 1/100 of the cost of a 15 million gpd plant, the fraction is far higher. Therefore the incremental cost to address environmental problems borne by the citizens of the small town are often higher than for a larger town or city. The incremental cost borne by municipalities to address environmental problems also depends on the history of development in the community and the level of maintenance performed. (5)

While the environmental protection standard must be the same for all, the conventional engineering solutions for environmental problems were originally conceived to address large-scale problems. The conventional solutions usually work at lower efficiency, if they work at all, at the small town's scale. This indicates a greater need for innovative solutions for the problems faced by the small town. However, innovative technologies, like conventional technologies, sometimes fail. If and when that occurs, a replacement must be found. Having placed the citizens under a significant financial burden in the first instance, it is even more difficult to get approval of the second project.

Larger towns or cities have similar, but perhaps less pronounced, problems facing them in terms of staff resources, budget priorities and political climate. They will have some staff and their officials are more likely to work full time at their governmental position. Operation and maintenance staff may be more skilled than in smaller towns. They face similar budget prioritization problems as the small town. Their infrastructures may be older and more in need of upgrade, but the higher level of development can make the upgrade more difficult to accomplish.

DES has a unique relationship with the municipalities of New Hampshire in two notable regards. First, DES is a financial partner with municipalities in matters of water supply, sewer, landfill closure, and waste oil management. New Hampshire offers general-fund grants to communities for these matters. This is in addition to low interest revolving fund loans for water supply, sewer and landfill closure projects. In the case of a failed solution, DES expects to financially participate to the same extent, assuming that liability for the failure can not be placed on another party.

Second, the municipalities often depend heavily on DES to provide technical oversight that they can not provide themselves, especially the smaller towns. There is a partnership in that the town and DES work together to solve problems the town faces. Sometimes DES proposes an innovative method the town was unaware of. Sometimes DES and the town work together to assess the potential impacts of the use of an innovative technology. In wastewater treatment and disposal especially, the use of a new technology can affect patterns of land use.

Therefore, the specific needs of DES municipal customers are: technical support, a significant effort to educate the public on the need to address the specific environmental problem, and at least sometimes, financial support. It must be understood that these problems will be played out in the political arena. Any opposition to DES decisions will likely be expressed through political channels, and sometimes through legal channels.

Acceptance of the need to solve a particular problem by the citizens of a municipality is the key first step, which is sometimes skipped. The party that must accept the need is a large body of people acting through a political process, not a single decision-maker.

Public-sector bodies other than municipalities are occasionally DES customers. One example is the former Pease Air Force Base, where the US Department of Defense (DOD) is one of DES's customers. These cases are not directly discussed in this report, as this is a relatively rare occurrence in New Hampshire. Larger public sector bodies such as DOD have a blend of the characteristics of the public and private sector customers described here.

#### **2.3.3** The Private Sector Customer

DES's private sector customers need DES approval of proposed methods of handling waste materials, treatment or elimination of their wastewater streams, treatment or elimination of their air emissions, and management of contaminated properties.

While there are similarities between businesses and municipalities as DES customers, there are significant differences as well. Compared to the public sector, DES's private sector customers tend to have better professional technical and legal support, and somewhat greater flexibility in how they allocate their financial resources. They have greater flexibility in hiring new people and altering their management structure to address new problems than the public sector does.

One important characteristic of private sector customers is that they pose a greater variety of problems than the public sector or individual customer. The many types of processes used in various commercial and industrial settings place a burden on the regulator to gain sufficient understanding of each applicant's problems.

The expertise of personnel performing operations and maintenance is highly variable in the private sector, ranging from a full professional staff to a single minimum-wage employee. The level of understanding of the regulatory requirements is also highly variable.

For the larger private sector customers some new forces can come into play, pressures from stockholders and policies that originate at a home office in another state or country. In these cases, there is sometimes a need to educate these other people to the actual existence and validity of New Hampshire laws and regulations. In these cases, the person actually dealing with DES can be pressured from both sides, and it is important to recognize this if the problem in question is to be solved.

One key difference between the two classes of customers is the business community's desire for quick decisions. The days of mass-production runs lasting for years are gone. "Flexible manufacturing" is the method used now. Manufacturers use new types of tools that can produce one widget today, another tomorrow, and a third the next day. The only way to stay in business is to meet the customers' exact needs today, and new needs tomorrow.

The useful and profitable life-span of a new product line can sometimes be measured in weeks. Where a permit application contains an innovative technology, it can take more staff time to process the application than for a more standard technology. If permits can not be issued in a timely manner by all responsible government entities, the firm's profitability can be ruined for that year, if not permanently. It is important to remember that the municipality, DES, and EPA can all have roles in issuing a permit or permits. DES may not control the entire process.

This need for quick decisions does not exist for all private sector cases, but it does for enough cases to be significant for management of DES's work. Certainly, the <u>desire</u> for quick decisions exists in more cases than where there is a strict <u>need</u> for quick decisions. While quick decisions are needed by this customer, DES and the other customers (the general public, etc.) need <u>correct</u> decisions.

Some of the discussion above concerns the affects DES actions can have on a firm's balance sheet. Why should DES be concerned about any firm's profits? Because a business operating on a shoestring or under bankruptcy trustees is a business that will be less willing to commit resources to address environmental problems. This is not to say that profitable firms will automatically be good environmental citizens. Rather, the odds are greater that a profitable firm, as opposed to an unprofitable firm, will be a good environmental citizen.

Private sector customers sometimes have concerns about the confidentiality of information that they are asked to share with regulators. These concerns usually are centered on having confidential business information placed in public files, where it can be found by competitors. This is especially important where a new industrial process is being considered. There may be patent applications pending, or a chance at a significant market can be lost if this information is not handled correctly. In order for a DES reviewer to approve an application, he or she must have an in-depth understanding of the process or facility, which can conflict with a business person's desire to keep information on the details of a process out of competitors' hands.

Whether or not regulations specifically mention it, the law allows DES to keep business information confidential, within certain limits. If an applicant marks <u>specific</u> items correctly as "Trade Secret" or "Confidential Business Information," DES will review the material, but it will be kept in a separate confidential file. If properly designated as confidential, this material can be made accessible to others only by a court order. The business or owner of the records, or on occasion DES, may contest such an order.

The specific needs of the private sector customer mainly focus on decision making in a predictable, hopefully quick, time frame. Understanding a particular customer's, or applicants, particular problems is key to efficiently finding solutions. For the private sector, any opposition to DES decisions will probably come in the legal arena.

#### **2.3.4** The Individual as DES Customer

Individuals, in almost all cases, request DES approval for items related to residential construction, such as subdivision of land, septic system designs, shore land development issues, wetlands permits, and site-specific erosion control permits. There are few technological issues involved in these matters, except for some new methods of on-site wastewater treatment and disposal which are sometimes proposed in lieu of standard septic systems.

The individual is almost always working under tight financial limits. He or she will usually find it very difficult to re-do a job which does not work correctly the first time. He or she probably does not have a background in environmental regulation, and may simply be unaware of the requirements.

One characteristic of the individual regarding technological issues is that, for a technological solution, operation-and maintenance requirements must be absolutely minimal. Experience clearly shows that the basic person-on-the-street wants the water to arrive and the wastewater to leave with no thought or effort involved.

Any opposition to DES rules or decisions will probably be expressed by the individual by ignoring them.

#### **2.3.5** DES's Customers - Differences and Similarities

All of DES's customers expect and deserve consistent high quality performance within the quickest feasible time frame. The time frame is important to all classes of customers, but appears to be most important to the private sector customer.

Often, the private sector customer has the greatest technical expertise, although the larger municipalities can match the private sector in this. Individuals and small towns can be expected to have little technical expertise.

The private sector also often has the greatest financial flexibility, although it is important to remember that they are first, not "made of money," and second, that they can be financially sophisticated and will only spend money where they see a clear and compelling need. Like all characteristics of the private sector described here, the financial capacities of private sector customers are highly variable, ranging from the one-person firm to the Fortune 500 corporation. The public sector customer has little flexibility in using its limited finances, while the individual can be expected to simply have limited finances.

Most matters brought to DES by municipalities will have large potential impacts on the environment and public health. Private sector matters will vary from minimal impact to extremely high impact, such as problems that end up as Superfund sites. Most matters brought to DES by individuals will have limited potential impact.

The private sector customer will usually have a greater desire for speed, greater financial and management flexibility, greater technical expertise but most of all, high variability within the group. Any opposition usually comes through legal routes.

The municipality as DES customer may have less technical expertise in house, financial limits, and greater needs for education and out-reach. There is a partnership between DES and the municipalities that does not exist with the other classes of customers considered here, a financial and technical partnership. Any opposition usually comes through political routes.

The individual customer will usually have severe financial limits, and less technical expertise. Any opposition usually comes in the form of ignoring the requirements. Education is often necessary.

In all cases, public health and environmental quality are impacted by the matters that these different customers seek DES approval for. Incorrect decisions will not support DES's mission.

#### 2.4 Federal Statutes

Since most of DES's programs were either mandated by federal legislation, or are overseen by federal agencies such as EPA, some discussion of the various federal statutes governing environmental matters, and the provisions in those statutes and/or associated regulations regarding evaluation of innovative technologies is included here.

#### 2.4.1 The Clean Water Act

The federal Clean Water Act regulates the quality of surface waters by controlling discharges to these waters. Obtaining a permit for discharge of treated wastewater is the most common technology-related matter regulated under this program. Great improvements to surface water quality over the past 25 years in the United States can be attributed to this program. Authority is delegated to the States, provided their programs meet certain criteria. New Hampshire DES is the lead agency for most aspects of this program.

States are mandated under 40 CFR 35.3140 to regulate in a manner similar to the National Environmental Policy Act. When evaluating technology alternatives, the criterion is: "Comparative evaluation among alternatives including the beneficial and adverse consequences on the existing environment, the future environment and individual sensitive environmental issues that are identified by project management or through public participation..." (6)

Technology evaluation criteria are also found in 40 CFR 125, where categories such as "Best Available Technology," "Best Practicable Waste Treatment Technology," and "Best Available Technology Economically Achievable" are used for different classes of pollutants. Criteria are listed which the regulator, or permit writer, is to use in judging whether a specific application fits the relevant category. The use of "Best Professional Judgement" is explicitly allowed.

### 2.4.2 The Clean Air Act

The federal legislation covering control of air pollution, the Clean Air Act (CAA), is very complex. States are delegated authority to regulate in this field, once they establish regulations that meet with EPA's approval. DES has secured delegation in most matters. Air regulations are written for specific pollutants, or families of pollutants, and also for specific industries. Many are written around technology and performance standards. Each section usually requires the use of a specified technology, with provision for showing either that an alternate method achieves the same results, or that the specified technology is impractical for the specific application. Proof of equivalency or impracticality is an arduous process in practice. The intent is that the specified technology is usually the best, or only, choice available, according to those involved in development of the regulation. The PSNH-Merrimack case study in Section 3.2 is illustrative of this. Interestingly, this technology based framework was put in place when the CAA was amended in 1990 at the request of the industrial community, who were having difficulties working with an earlier performance based framework.

Certain sections of the federal legislation touch on choice of technology. 42 U.S.C. 7408(b) tasks the EPA Administrator to assemble and issue information on air pollution control techniques. Costs, energy requirements, and environmental performance must be included. Performance standards for control technologies are written around concepts such as "Reasonably Available Control Technology,"and "Maximum Available Control Technology." Defining what these mean for each industry is typically left to EPA. Further, in 42 U.S.C. 7411c(d), the EPA Administrator is tasked to assemble a list of "best available air quality monitoring and modeling techniques" to determine the contribution of sources of contamination in one region to another. Similarly, the Administrator is tasked to issue technical guidance

on "reasonably available" and "best available" control measures for urban fugitive dust and emissions from wood burning devices.

While these measures have a performance component, they may also tend to memorialize the state of the art at a specific time. The pace of regulatory updates will likely be very important.

One problem with the CAA program that the private sector has mentioned are "Once In, Always In" provisions. These provisions were intended to allow EPA to regulate cut point skirters. Their actual effect seems to be that once a facility has been regulated as a "major source," it will always be regulated as such, no matter how much it reduces its emissions - even if emissions are reduced to zero. The cost of complying with major source provisions is such that it can act as a disincentive to reducing emissions, since the incentive of reduced compliance costs is not present. DES sometimes tries to address these issues through permit restrictions.

As stated above, the CAA and air pollution regulation in general are very complex. This section is not intended to be comprehensive, and interested people should contact DES' Air Resources Division for additional information.

# **2.4.3** The Safe Drinking Water Act

This is the Federal legislation describing all aspects of public water supply operation. Authority is delegated to the States, provided their programs meet certain criteria. New Hampshire DES is the lead agency for all aspects of this program. The Safe Drinking Water Act was re-enacted in the Summer of 1996. Because of this recent action, no Federal regulations were researched for this section; the actual 1996 Safe Drinking Water Act (SDWA) was examined for provisions effecting choices of technology.

In Section 105 of the SDWA, EPA is required to establish a list of treatment technologies that achieve acceptable performance for specified contaminants, for use in three classes of small public water supplies - populations of 25 to 500, 500 to 3,300, and 3,300 to 10,000.

Section 111 of the SDWA establishes a category of "variance technologies" for small water systems. These technologies may not be able to meet the actual maximum contaminant levels, but they will be the best performing, economically viable, alternative for the contaminant in question. EPA is required to list these technologies, provided there is performance data available under field conditions. EPA must accept that the proposed "variance technology" protects public health before listing the technology. This seems to be a recognition that some treatment technologies are inefficient at small scales.

The general framework of SDWA regulations regarding treatment technologies is written around "Best Available Technologies," specified for specific contaminants or groups of contaminants. There is an established protocol for evaluation of alternative technologies.

# **2.4.4** Federal Waste Programs

The body of Federal solid and hazardous waste regulation is extremely complex. Authority is delegated to the States, provided their programs meet certain criteria. New Hampshire DES is the lead agency for some, but not all, aspects of the Resource Conservation and Recovery Act (RCRA) program, the largest solid and hazardous waste program. DES's program mirrors the Federal program in great detail, this is a requirement for delegation of authority to the state. These programs have had success in that industries regulated under such programs as the RCRA or the Toxic Substances Control Act (TSCA) are markedly

reducing their use of hazardous or toxic materials.

RCRA regulations have many component parts, but two section are particularly important to innovative technology development. These are 40 CFR 264 (*Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities*) and 40 CFR 268 (*Land disposal restrictions*). These two sections were especially reviewed.

40 CFR 264 is intended to cover permitting requirements, is written in terms of performance standards, and does not appear to contain explicit restrictions to technologies. However, it should be noted that obtaining a permit under this section is not a simple process, even if it does not explicitly restrict new technologies.

40 CFR 268 is fairly explicit in limiting technologies used is some cases to treat materials that meet the definitions of "hazardous waste." The intent of this regulation is to prohibit placing hazardous material in or on the ground and thus increasing the risk posed by the material. However, 268.2(c), in defining "Land Disposal," includes in-situ waste treatment under the definition of disposal thus inhibiting the use of in-situ treatment technologies. This provision apparently does <u>not</u> apply to wastes that are generated on the property where the treatment occurs. Waivers, exemptions and/or extensions are available, but they are granted by EPA headquarters in Washington for non-authorized states. DES is pursuing authorization for this section of the program.

40 CFR 268 includes treatment standards that must be met before a waste can be placed in or on the ground. Section 268.42 (in conjunction with 268.40) lists wastes that must be treated either with a specified technology, or with that technology to a specified concentration limit, before land disposal. This has an obvious inhibiting effect on new technologies. 268.42 does contain provision for gaining approval of new technologies, but this function is performed at EPA headquarters. Therefore, persons with new waste treatment technologies must go through a Federal approval process, which is somewhat time-consuming.

Any person who treats, stores, and/or disposes of materials defined as hazardous waste in RCRA (40 CFR 261) must obtain a permit under 40 CFR 270. In the case studies described in Section 3.2. of this report, it is seen that permitting requirements under RCRA are considered difficult, at best, to comply with. 40 CFR 270 contains the requirements for application. They are voluminous, taking up 20 pages of the printed volume. They appear to be written around an assumption that all permitted facilities will be full-scale waste handlers.

NH regulations have provisions for limited permits for some waste generators to treat their own wastes by certain means. This was originally intended to apply to the by-products of industrial wastewater treatment or pre-treatment as treated in "elementary neutralization units." Obtaining this type of permit is a simpler process. In a current revision of the NH regulations which is in internal review (as of December 1996), DES is trying to expand the application of limited permits.

40 CFR 761, which covers handling of PCB-contaminated material, was also reviewed. PCB's (poly-chlorinated biphenyls) are regulated under authority granted in the Toxic Substances Control Act (TSCA), not RCRA. A few technology-limiting provisions were found. For example, 761.70(a) requires the use of water scrubbers for control of hydrochloric acid emissions in incinerators.

40 CFR 761.60 describes allowable disposal or treatment methods for PCB contaminated material. This section is heavily biased toward incineration or placement in a (permitted) chemical landfill. Parties who

want to use any other method must apply to the Regional Administrator and, in part, show that disposal of their waste by the two preferred methods is not possible.

This provision, and the similar ones in 40 CFR 268.42, can be assumed to be appropriate <u>at the time the regulation was written</u>. Inhibitions to innovative technologies arise where the pace of innovation becomes faster than the pace of regulatory updates.

In related regulation, 40 CFR 905 includes a requirement for EPA to maintain a list of dispersants and other products for clean-up of oil spills. This list is simply a list of available products, no product or performance evaluation is done.

### **2.4.5** The Comprehensive Environmental Response, Compensation and Liability Act

This law established the hazardous waste site cleanup program popularly known as "Superfund." This program was established in 1980, at a time of great public concern about the problem of chemically contaminated properties. This problem had been mostly unrecognized by society up to that time, and had become the subject of heated public discourse. It is intended to address the worst hazardous waste problems faced by the nation. The original legislation includes addressing threats from pathogens, but in practice Superfund has been a hazardous waste program. Parties that contributed to problems at a site in any way are found joint-and-severally liable. The Superfund program includes precise administrative requirements. In practice, the Superfund program has been marked by large amounts of legal activity.

40 CFR 430 includes the criteria by which remedial actions will be chosen. Evaluation of multiple alternatives is required. Three prioritized levels of criteria are listed in 40 CFR 430(f)(1). Protection of human health and the environment, and compliance with relevant regulatory requirements are the highest priority, referred to as "threshold criteria." Long-term effectiveness and permanence; reduction of toxicity, mobility or volume; short-term effectiveness; implementability; and cost are referred to as "primary balancing criteria." State and local acceptance are referred to as "modifying criteria."

Proven performance of a technology is not explicitly listed as a criterion for evaluation. However, information to support the effectiveness and cost criteria is required. The relative weight given to this information seems to fall into the realm of administrative judgement. 40 CFR 430(a)(3(E) includes language stating that EPA will consider the use of innovative technologies where it seems possible to achieve similar performance at a better cost or better performance for a similar cost, as compared to demonstrated technologies. EPA headquarters issued directives in 1991 and 1996 to promote the use of innovative technologies.

In 1990, the Superfund program, recognizing that innovative technologies for site clean-up were not being used, established the Superfund Innovative Technology Evaluation (SITE) program. The SITE program offers technology developers the opportunity to pilot their technologies at actual contaminated sites. EPA monitors their performance, and issues reports describing the technology and its cost and performance.

# 2.5 Permitting Paradigms

People or companies marketing new technologies regularly approach DES looking for approval of their new device or method. They seldom get the answer they expect. This is because of a simple fact which apparently is not widely understood. Under New Hampshire's current regulatory framework, **DES** seldom permits or approves technologies, per se. DES approves site-specific applications for

site-specific reasons, mandating site-specific results. For instance, approval of selective catalytic reduction for off-gas control at a coal-fired electric utility boiler in Hillsborough County (actual case), has practically no effect on what action DES would take on an application to use selective catalytic reduction at a paper mill in Coös County (imaginary case). Has DES "approved" selective catalytic oxidation? Yes, and no.

DES is careful to stay within the limits of its authority and there is no specific legislative mandate given to DES to be a judge of technologies. Further, neither DES nor many other state-level government bodies have the resources to do the kind of research necessary to adequately judge the applicability and usefulness of innovative technologies in the absence of a specific need to do so; research is not our job.

There is one exception. In the field of on-site wastewater disposal, or septic systems, DES approves specific technologies for treatment and/or disposal of wastewater on site. It should be noted that the regulations governing this field are entirely prescriptive, i.e. containing design standards, while other DES regulations are performance oriented.

When faced with proposals for use of an innovative technology or method, either in general or in a proposed application, DES tries to find time to provide the proposing party, or applicant, with an interpretation of how the proposal fits within the existing body of rules. Therefore, the applicant gets a letter which can accurately be called an interpretation of the rules or perhaps a letter of non-objection but which strictly speaking is not an approval. They are sometimes used as approvals by the applicant for marketing purposes, however.

The desire of a technology developer to gain "approval" is entirely understandable. The first question a potential customer will ask is "Has your product been approved?" The developer's customer will not want to spend money on an unapproved or unapprovable device. At the same time, the public often calls DES wanting to know what solutions are possible for certain problems, that is, what does DES approve of? There seems to be a demand for a service in this area. No tracking of calls of this nature has been done, but it appears that DES receives several calls of this nature every week.

To return to the selective catalytic reduction example mentioned above, clearly the second time someone applies to use this technology in New Hampshire it will be easier for DES to review the application, since the personnel in DES's Air Resources Division now have some experience with that particular technology. When people ask if a technology has been "approved," sometimes they are really asking if that technology has been used in New Hampshire before, or if staff is familiar with that technology. It is not always clear exactly what question is being asked.

This is a language barrier.

One way to address these conflicting needs is found in the Commonwealth of Massachusetts. Recently passed legislation in the area of residential wastewater disposal ("Title 5") includes an requirement that their Department of Environmental Protection prepare and periodically update a list of approved methods for residential wastewater treatment and disposal. The utility of such a list of approved methods to the property owner and others is obvious.

Some programs, such as the Toxic Substances Control Act (TSCA) program, which EPA administers, give technology-specific permits after a program of testing and evaluation. There are no such programs currently in place in New Hampshire government.

# 2.6 Government's Role

The matters discussed above lead to a matter that needs to be mentioned, however briefly. Just what is government's proper role in technology innovation? Unfortunately this topic often leads to acrimonious debates, but it deserves some mention.

DES is faced with conflicting needs as regards innovative environmental technologies. The need for better solutions must be balanced against the need for sure solutions. Innovation is a trial-and-error process by its nature. Where errors are not allowed to occur, there will be no innovation. Where there are failures, the public will rightly take the regulators to task. Finding an appropriate balance is the challenge.

DES, like any organization, has a desire to take reasonable actions that help it reach its goals more efficiently. Assuming that the goal of a clean environment is not being as efficiently reached as possible, DES is probably justified in trying to find better ways to reach the goal, and to make sure that it is not doing anything to impede reaching that goal. That is the explicit purpose of this report.

There is a desire in certain sectors of the public for government in general, and DES specifically, to review the applicability of environmental technologies, and to issue approvals where appropriate. The phrase "EPA approved" brings credibility to a technology throughout the world, but EPA is not the only agency which certifies or verifies technologies, Underwriters Laboratories in the field of electrical equipment is an example of a private-sector supported certifier of equipment. NSF International (formerly the National Sanitation Foundation) and the International Standards Organization are providing similar services in environmentally-related matters.

Such an approval or certification adds value for a potential user of a technology in that it adds to the user's comfort level with the use of an innovative technology. It adds value for the consultant who is risking significant professional liability by recommending one method over another. It adds value for the reviewer at any level of government who can then proceed to focus more on whether a technology is appropriate for a specific problem than on whether the proposed method or technology actually works. Nevertheless, from the regulators' point of view, the utility of a technology-specific approval is open to question. A technology-specific approval would have to include caveats to the effect that application, operation, and maintenance of the technology in question at a given site may not result in achieving the desired goals. From the regulators' point of view, site-specific review and approval is still necessary for a "pre-approved" technology.

#### 3. STAKEHOLDER INPUTS

# 3.1 The DES Innovative Technology Committee

The DES Innovative Technology Committee (the "IT Committee") was created to assist DES in identifying regulatory barriers to innovative technology, especially to provide the customers' view. The IT Committee has met nine times to discuss the existence of these barriers, the nature of the barriers, and what might be done to address problem areas.

This section summarizes of the discussions at the IT Committee meetings. The IT Committee met on February 1, February 22, May 9, May 23, June 27, August 8, September 16 and October 18, 1996, and on January 20, 1997. For a more complete treatment of the discussions, the minutes of the meetings are attached to this report as Appendix C.

#### Discussion topics included:

- The role of technology verification in technology approval.
- The role that other government agencies play in DES-regulated matters.
- Regulatory negotiation versus command-and-control regulation.
- Difficulties in New Hampshire's administrative rule-making process
- The need to arrange for a second, more conventional, solution to an environmental problem if an innovative solution fails, and ways to arrange this.
- The role DES should play in assisting technology developers.
- Difficulties in enforcing environmental standards that are either prescriptive or performance-based. Expectation of the need to comply with regulations was noted, as was the possibility of making penalties more proportional to the risk or damage posed by a violation.
- Various cases of technology approval or denial that committee members had been involved with.
- The need for demonstration sites to pilot-test new technologies.
- The need for a technology information clearinghouse.
- The need not to approve proposals that look like they won't work.
- Another project that DES is participating in was discussed. This project, led by the New England Governors' Conference (NEGC), USEPA Region I, and all six New England state's environmental agencies, is trying to establish a regionally consolidated review of the technical merits of innovative technologies for on-site wastewater disposal, and is discussed further in Section 5.3.

The need to examine actual case studies became obvious. A list of cases where innovative technologies or methods were actually proposed to DES, taken from the results of an internal DES survey, was presented to the IT Committee. Members of the IT Committee agreed to interview the applicant's project manager. The DES coordinator interviewed DES's project manager for each case. See Table 2 for a list of the case studies. The case studies are discussed in Section 3.2.

#### Table 2

Cases of Approval/Denial of Innovative Technologies Extracted From Winter 1996 DES Survey

Name	Applicant	Approved Y/N	Notes
Coating Labs, Inc.	Coating Labs, Inc. Westbrook, ME 04092	N	Proposal to start paint recycling plant
Candia paint & battery collection	Town of Candia Candia Solid Waste Comm.	Y	Permitting of waste handling activity
Encapsulating used tires to make blocks	Plymouth Public Works Department	N	Permitting of waste handling activity
Nashua Household HazWaste Collection	City of Nashua	Y	Long permit process
Crown Vantage turpentine	Crown Vantage, Inc. Berlin, NH 03750	N	Proposal to recycle turpentine for on-site fuel
Selective Catalytic Reduction	Public Service of NH, Merrimack Station	Y	New application for emissions technology
Plastic Sand-Blast Media	US Technology Corp Canton, OH 44072	Y	Proposal to re-use plastic beads used for paint removal
Plymouth RBC's	Plymouth Vill. Water & Sewer District Plymouth, NH 03264	Y	Innovative sewer treatment plant installed.
Somersworth Landfill	City of Somersworth	Y	Innovative cleanup method chosen at Superfund site
Dover - Municipal Landfill	City of Dover	Pending	Innovative cleanup method proposed at Superfund site.
Lee Circle Mobil	Oyster River Investments N. Andover, MA 01845	Y	Innovative cleanup method chosen at contaminated gas station.

Several comments were received from member organizations. These comments follow:

# Granite State Designers and Installers

This organization, in the on-site wastewater disposal field, reported to DES's coordinator on their impressions of DES's existing approval process for innovative technologies. They felt that there was no credible process for approval of an innovative technology and that such a process was needed since the existing system is too loose. They stated that if approval is given for pilot applications, third-party monitoring should be required.

New Hampshire Water Works Association

This organization reported that the need for innovation in the municipal drinking water field was entirely driven by EPA, as opposed to DES, since EPA promulgates all regulations in this field. (DES regulations closely follow EPA's) They felt that there was no great present need for innovation since the regulatory climate had been stable for the last several years. They reported that the Association of State Drinking Water Administrators (ASDWA) was working with NSF International and EPA to produce a protocol for review of innovative technologies. The ASDWA circulated its final position paper including a protocol in June, 1996; a final protocol is expected to be issued by NSF International by the end of 1996. (See discussion of this program in Section 5.3)

# New Hampshire Business and Industry Association

The NH Business and Industry Association (BIA) reported a desire for DES to be more flexible in interpreting hazardous waste regulations, especially the RCRA-related rules.

An electric utility noted that there was an unintentional barrier in Federal hazardous waste rules in that by making fluorescent light bulbs hazardous waste under the regulations, recycling or any disposition of used bulbs became difficult, but that DES was trying to address this problem.

The manager of a metal casting firm indicated that he had noticed environmental regulators had begun to see that some of their requirements were counterproductive. He also noted that "...beneficial re-use of industrial byproducts suffers when environmental liabilities are so much greater than any environmental reward." Because of this, he sees no gain to be made by his firm recycling industrial byproducts, or waste.

# University of New Hampshire

The University of New Hampshire representative reported that problems with regulatory acceptance of innovative technologies did not lie with government's administrative practices, but more with the need for vendors to provide third-party verified performance data so that DES can make informed decisions.

### The Appalachian Mountain Club

The Appalachian Mountain Club proposed criteria for use in judging whether to accept an innovative technology proposal: the innovative solution must provide performance at least as good as the standard, with life-cycle (capital plus operation and maintenance) costs at least on a par with the standard. Whether the innovative proposal is a short-term or a long-term solution should be considered.

# New Hampshire Bar Association

The Bar Association reported that the rules governing New Hampshire's administrative rule-making process are being re-written, which could give DES a chance to make changes it finds beneficial.

# Environmental Business Council - New England

The Environmental Business Council - New England reported that better outreach by

government as to its willingness to consider innovative solutions is needed, and that an information clearinghouse is needed. This clearinghouse would list technologies, the areas in which they had been found applicable, and their approval status with government bodies.

After discussing the case studies, ways to improve regulatory acceptance of innovative technologies were discussed. Two basic methods of addressing regulatory acceptance of innovative proposals were proposed and discussed. The first method focussed on administrative practices. An advocate, or ombudsman, working outside the normal programs would be required to assure that innovative proposals received a fair hearing and assisting applicants through the regulatory maze. One problem with this scenario is that the ombudsman could get brought into personality or jurisdictional conflicts between individuals or offices too easily. The other basic method advocated was for new legislation or regulation allowing something similar to the "Enhanced Environmental Performance Agreements" now allowed under DES's air programs through 1996 NH House Bill 1325, which established RSA 125-C:6-a. Having regulations or legislation can potentially avoid, or overcome, personality and jurisdiction conflicts.

It was noted that, in general, the amount of input that has come in to DES regarding this project has been quite small, in spite of publicity from member organization newsletters, press coverage, and so forth. Also, in most of the case studies, the innovative proposal was actually accepted, if slowly and perhaps inefficiently. These items led to a (tentative) conclusion that DES does not have a large-scale problem with acceptance of innovative technologies, but rather a series of small problems which need to be addressed case-by-case.

Information on several example programs trying to help innovative environmental technologies from around the country was given to IT Committee members. The Massachusetts Department of Environmental Protection (MADEP) Innovative Technology Coordinator spoke with the IT Committee and answered questions. MADEP's program is described in Section 5.3.

# 3.2 Case Studies

For each of the case studies listed in Table 2, a member of the IT Committee contacted a representative of the applicant, while the DES project manager was interviewed by DES's coordinator for this project. The reports of both sides of each case are summarized below, with some comments. Opinions stated here are those of the actual person contacted, and may not reflect the parent organization's policies.

• Coating Labs, paint re-cycling

In September, 1992, a company contacted DES, stating that they wanted to start a paint re-cycling operation in New Hampshire similar to one existing in Ohio, and asking how or if this could be done under New Hampshire's regulations. In February, 1993, DES wrote back stating that the proposed facility must be subject to full RCRA hazardous waste treatment facility permitting requirements. The applicant had made reference to 40CFR 261.6(c)(2) which exempts "...facilities that recycle recyclable materials without storing them..." from much of the body of hazardous waste permitting requirements. DES did not accept the argument, and a request for reconsideration was denied.

The applicant contact did not return calls from the IT Committee member. Members of his staff indicated that he was not happy with DES.

The DES contact felt that the outcome of this case was not desirable for the people of New Hampshire, in that paint would be disposed of in landfills instead of being recycled.

# • Town of Candia, Paint and Battery Pickup

The Town of Candia, New Hampshire, had a recent problem with permitting a paint and battery pickup facility, and a dispute over the closure of an old landfill. Permitting a separate paint and battery pickup, so that these materials can be disposed of in a more environmentally sound and economical way, was new to DES. Candia noted a lack of flexibility at DES, a parochial attitude, and a lack of staffing. They felt that the problem was solved politically.

DES's project manager had a somewhat different story. Candia filed a permit application (for the paint and battery collection) in 1991, which got lost. The problem was found out in 1995 and given to him to pursue. He, in his words, "went to the Town with his hat in his hand," and began negotiations to fix the problem. A permit was issued in May, 1996. Beyond the paint & battery permit issue, there was an additional issue that arose at this time about the closure of an old Town landfill. It was difficult to separate issues related to the paint and battery pickup from those related to the closure. The Town's comments on political problem-solving seem to relate to the landfill closure.

# Town of Plymouth, Casting Tires Into Concrete Blocks

In 1994, the Town of Plymouth, New Hampshire, made a verbal proposal to DES to encapsulate used tires in concrete to make large blocks. These blocks could be used for retaining walls, to restrain sand and salt piles, etc. This forms a proposal to re-use a waste roduct, which requires DES review. The Town said that they are waiting for a DES response. The Town also stated that DES did not have resources to help communities.

The DES party described the same project, but he said that DES was waiting for the Town to propose something in writing. He said that he described to the Town the process of obtaining a "Certificate of Re-Use" from DES. He did say that at the time of the proposal, DES was very worried about all environmental effects from used tires, since this particular proposal was made just after a large tire pile fire. He went on to say that if the Town made such a proposal now, there shouldn't be any problem with it, as DES has learned more about the impacts of used tires.

#### • Town of Plymouth, RBCs for Sewer Treatment

This case involves the proposal, approval and construction of what is now the town's existing sewer treatment plant, which occurred in the 1989 to 1990 time frame. The plant uses Rotating Biological Contactors (RBCs). This technology is fairly well established at the national level, but not in New Hampshire.

The Town said they felt they had to jump through more hoops than necessary to get this plant approved, and that DES did not have a positive attitude towards RBCs.

The DES party painted a slightly different picture. A legally required (under the Clean Water Act) "Facilities Plan," an engineering planning report on the Town's wastewater disposal problem, was filed, in which the use of RBCs was recommended. This particular Facilities

Plan was an updated report, following a report done five years earlier. The earlier Facilities Plan recommended use of a technology, extended aeration, which has since been found to not work as well as desired. DES reviewed and approved the updated facilities plan, and recommended construction of the RBCs. Many reviews were required, and public hearings held. Apparently, all these reviews and hearings are required by law. For instance, the State Historical Preservation Office, Fish & Game, and the US Army Corps of Engineers must review Facilities Plans. DES also noted that RBCs had fallen out of favor for a while due to a specific design flaw in one vendor's equipment, which has apparently been addressed.

### Nashua Household Hazardous Waste Drop-off

The City of Nashua, New Hampshire wanted to build a facility where citizens could drop off household-generated hazardous waste (HHW), such as used oil, paint and thinners, automotive or cleaning products and so forth, because people were pouring the wastes down the drain or putting it in with the regular trash. Note that hazardous waste generated by a household is not regulated under State or Federal hazardous waste rules.

Originally, a DES planner had contacted the City in 1993 about the possibility of grant money for this purpose. The City decided to pursue it. Upon application, DES told the City in January 1994 that a Solid Waste Permit was required. Some time later, the New Hampshire Department of Justice, Attorney General's Office (AGO) became involved and said that DES was mistaken, that a Hazardous Waste Permit was required. The City said that DES "bent over backwards" - their words - to help. The City noted the waiver provisions in the waste rules, apparently saying that this option could have been used but wasn't. Communication between DES and AGO was a problem. They now have their permit, which is a double permit under Solid and Hazardous Waste Rules, and the facility started operation in August 1996, but the process took three years. In addition to HHW, small quantities (up to 20 gallons per shipment) of commercially-generated waste can be accepted by appointment.

The DES contact told an almost identical story. Apparently, the waste rules as written simply did not anticipate this sort of situation, and many interpretations of rules and statutes were needed. He said that the City was patient and responsive. As the complexity of the regulatory issues became apparent, the AGO was brought into the process. In retrospect, the process would have been improved if the AGO was included from the start and if a single DES project manager was assigned to the project rather than assembling an informal review team. It was also noted that this sort of facility has been permitted in other states (Vermont was his example) far more easily. DES does regulate small quantity waste generators more stringently than some other states.

In response to the comment on permitting in Vermont, the Vermont Agency of Natural Resources (VTANR) was contacted. VTANR reported (7) that they had permitted three separate HHW drop-off centers under their Solid Waste rules, two of which also allow the permitted entity to use a truck to pick up HHW at remote locations. They did not involve their Attorney General's office in the process, feeling that this was a matter entirely within VTANR's jurisdiction. All the fixed facilities accept both HHW and wastes generated by a class of waste generators called "Conditionally Exempt Small Quantity Generators" (CESQG's). The CESQG concept is the result of VTANR's determination that the regulatory difference between wastes generated by a business and non-regulated HHW can be artificial at times. This distinction does not exist in New Hampshire's program. The last facility

permitted in Vermont took about one year from application to issuance of the permit. VTANR has written guidance documents for permitting HHW drop-off facilities.

• PSNH Merrimack, selective catalytic reduction at a coal-fired boiler.

Public Service of New Hampshire's (PSNH) comments did not address this particular, but were rather on the management of the NH Petroleum Reimbursement Funds, which offer owners of certain petroleum storage facilities reimbursement of some costs associated with cleaning up releases of petroleum. They felt that conservative project managers at DES were preventing innovative cleanup methods from being used.

DES's project manager, in discussing this Merrimack case, described a long process of negotiations, beginning in 1990, when the federal government required states to make rules defining "Reasonably Available Control Technology" (RACT) to control emissions of oxides of nitrogen (NO<sub>x</sub>) to the atmosphere. PSNH was involved in discussions with DES and other stakeholders during this time, as all parties sought agreement on what RACT meant for NH. In 1992, a rule was issued by DES that said a plant had to use either a specific technology (the RACT - selective non-catalytic reduction) or meet a certain limit of mass emitted per year. Before rule-making, DES had suggested selective catalytic reduction (SCR) as RACT for this class of boiler, which are major emitters of airborne contaminants. PSNH felt strongly that SCR would be far too expensive and need too much maintenance to be considered reliable. After the rule was issued, PSNH continued research by looking into European practice, and decided that SCR could work. Apparently, SCR is considered to be a standard technology for this application in Europe. A Permit to Operate (under Title V of the CAA), which included SCR, was applied for and accepted by DES.

PSNH was aware that further cuts in  $NO_x$  emissions would be required in 1999. DES's project manager said that use of SCR at this plant should allow PSNH to meet those future limits. He noted that the originally-specified RACT did not work as well as anticipated. He also said that this case is an example of succeeding by involving all parties in rule-making. Good environmental results have been achieved. It should also be noted that EPA has not approved the DES  $NO_x$  RACT rule, which was submitted for EPA approval two years before this report was prepared.

• Crown Vantage, turpentine recycling

Crown Vantage (formerly James River, the large Berlin, NH, paper operation) produces turpentine as a by-product of its processing of trees. They wanted to use this turpentine as a fuel on site, in a lime kiln.

The contact at Crown Vantage had quite a bit to say about this case. Points that he made include:

- Regulators are inflexible in interpreting regulations.
- He sees a variable response from DES depending on what <u>person</u> he gets at a particular time.
- The rules are impossible to comply with.
- Managers have no flexibility as to who they assign to a given project.
- DES is doing good work, that dissemination of information is lacking.
- This "Barriers" project is well-meaning, but that there will be no follow-up.

• The more junior the staff, the more time lag there is in response.

DES response to Crown Vantage was that a full RCRA permit was required to burn this waste turpentine as a fuel. There are provisions in both the State and Federal rules stating that when a waste is re-cycled by burning for energy recovery, it shall be considered a waste throughout. Use of the waste as a fuel is defined as "disposal," as opposed to "re-cycling." Therefore, waste handling permits are required. Since this waste turpentine is a "hazardous waste" under the rules, a full RCRA permit is required to recycle it. Some materials are allowed to "exit" the waste rules when recycled by burning, turpentine from wood products is not one of them. This restriction is in the Federal rules and is mirrored in the State rules. This restriction has led to this turpentine being disposed of (legally) as a waste rather than recycling it, since Crown-Vantage decided that the cost of getting a full RCRA permit was greater than any possible gain from the recycling.

• US Technology, Recycling Used Sand Blast Media

US Technology wrote to the State to determine if their process of cleaning and re-using plastic beads used to "sand-blast" painted surfaces was allowable in New Hampshire. DES's final determination was that their proposal was acceptable under the rules. It took DES two years to reach this conclusion.

The contact at US Technology had comments which were on government environmental agencies in general:

- He noted a need for the applicant to be a "pest" his word and keep pushing.
- He cited turnaround in regulatory staff, and both lack of training and experience and lack of nderstanding of the applicant's position on the part of regulatory staff.
- He noted that regulatory staff does not want to take risks in decision making, and feels that Department heads could set a tone for a more active staff attitude.
- He felt that getting the right individual to review a proposal makes a lot of difference. He noted that US Technology had submitted proposals to 35 states, some had given no response at all, some had said that they "don't recycle." He stated that he was not dissatisfied with DES overall.

The DES party described the same project as US Technology did. From his point of view, this matter was assigned to him as a low priority job. He had to determine how this proposal fit in the rules, determine if this constituted recycling or treatment & disposal under the rules, build a consensus between the solid and hazardous waste regulators, and then sell the determination to management. There were telephone calls between DES and US Technology, leading to US Technology supplying additional information. Strictly speaking, the letter that finally went out was not an approval, rather it was a rule interpretation. He noted that this is not the type of work that the EPA grant supporting his position allows, so it had to be done on a low-priority basis.

• Somersworth Landfill, Superfund site

This site is under EPA control, as opposed to DES. At this site in Somersworth, an innovative treatment scheme has been approved. According to Somersworth's City Engineer, the potentially responsible parties (PRP's - those parties legally liable) went looking for a better, less expensive, way to meet the required environmental goals. He stated that it was difficult convincing regulators

and some of the PRP's that this new method, "reactive groundwater treatment walls," would actually perform. The developers at the University of Waterloo in Ontario, Canada, provided technical information on the method. The PRP's also had to convince EPA that they had the financial capacity to implement a standard remedy if the reactive groundwater treatment wall failed. He feels fortunate to have General Electric as a PRP in the group, because large- scale financial capacity was needed to do the work necessary to convince EPA and DES that the innovative proposal would work, a financial capacity beyond that of the City's or a smaller company's. He stated that government fear of failure was a problem, and he saw a difficulty in convincing government that it was in their interest to interpret regulations somewhat flexibly. He stated that there is no incentive for the regulator to approve an innovative technology, and that their organization is not set up to deal with this sort of request.

DES contacts indicate that DES agreed to this method before EPA did, and that DES had to work hard to get EPA to accept the innovative proposal. The DES project manager feels that an appropriate solution was reached for this site, but that it will mean that DES will have to spend time screening out all sorts of unusual clean-up proposals in the future.

EPA Region I's project manager indicated that the PRP's presented this proposal to them in the third of four drafts of the required Feasibility Study. Consultations within EPA, and the fact that this reactive groundwater treatment wall technology had been accepted into Superfund's innovative technology evaluation (SITE) program, led to EPA becoming comfortable with this innovative clean-up method. Following that determination, EPA has pledged to pay 50%, up to \$3.5 million, of the cost of implementing a conventional solution if the reactive treatment wall system fails. One problem was that this technology was brought to EPA's attention late. Two draft Feasibility Studies, which did not mention reactive groundwater treatment walls, were rejected for inadequacies before a third report came in recommending their use. He felt that a correct decision was reached in the end.

# • Dover, Municipal Landfill Superfund site

Like the Somersworth Landfill site, this site is under EPA control, as opposed to DES. A Consent Decree was established in 1992, following a 1990 "Record of Decision" (ROD), laying out a conventional clean-up involving capping the landfill and extracting contaminated groundwater to control the dissolved plume.

The City of Dover indicated that the City and some of the other PRP's specifically began looking for innovative methods that would allow the PRP's to meet their responsibilities while spending less money. Once a reasonable looking idea was found, they then had to sell the other PRP's on this idea, and then sell EPA. At this time, they are working on convincing EPA that their idea can work. Their idea is to actively augment the microbiology of the contaminated area to control contaminated groundwater associated with the landfill, and to modify the cap design to allow for greater beneficial biological activity in the landfill itself.

The DES project manager said that the PRP's were meeting their legal deadlines in the Consent Decree. The PRP's have completed design of the remedy included in the Consent Decree. At that time there had been no formal alternative proposal yet by the PRP's, but many discussions. He said that "everyone is playing it too close," that EPA won't say what they want, but he feels that the PRP's are being fairly open. One problem he saw is that the PRP's and EPA always bring attorneys to the meetings, so there was no way to conduct a

technical discussion. He noted that all these proposals are costing DES and EPA staff time, which is significant in that cost recovery by both agencies is capped by the Consent Decree. He was also concerned about the increase in total cost that would be borne by the PRP's in the case that the innovative method fails and the original remedy must be implemented. There is a concern at DES that EPA is excessively concerned with strict compliance with the ROD, because the state of the art in site remediation and the understanding of the site, and the risks posed by the site, have both changed significantly since 1990.

Since the original interview with the DES project manager, the PRP's have formally presented their innovative alternative. Discussions with DES and EPA regarding this proposal are going on as of this writing. Apparently, the PRP's view DES as being more receptive to their idea than EPA. Evaluating the effectiveness of the pilot phase of the innovative method and deciding whether or not to implement it on a full scale will be a key, and difficult, step.

#### • Lee Circle Mobil

This site is a gasoline station contaminated from past releases of gasoline. It is considered high-risk because of heavy groundwater use in the area. The DES project manager reports that an innovative clean-up method was sought by DES and the owner's consultant, with the owner's cooperation, because the site was not getting cleaned up using the standard methods. A 72-hour pilot test was run using a "dual-phase extraction" method. During this pilot test, about as much gasoline was removed from the ground as standard methods had in three years. The pilot test was considered a success, so per rules established by the NH Petroleum Remediation Funds, the remediation was bid out.

The owner's representative stated that he felt that while the initial proposal contained enough information for DES, he was not entirely confident that it would do the job of cleaning up his property. After the bids for the full scale remediation were in, a losing bidder approached the owner's representative, proposing a different innovative cleanup method. The owner wanted to try this different method, but DES stuck with the bid process. This particular conflict resulted in some delay.

Cleanup of the property is now proceeding fairly well, although the treatment unit has been down about 50% of the time. This is poorer performance than expected, or was indicated by the marketing, but it is still far better performance than the more standard methods had previously achieved.

These case studies will be summarized, with a discussion of the issues that they raise and lessons that can be learned from them, in Section 4.1.1.

# 3.3 Inputs From DES Staff

A survey memo was sent to all DES supervisory staff. This memo described the Innovative Technology Barriers project, and asked for their input. To initially frame the questions surrounding regulatory approval of innovative technologies, a list of categories of barriers was attached. This list was taken from a report prepared by DES in January 1995 titled *Barriers to Pollution Prevention Within a Regulatory Agency*, somewhat modified to reflect the new subject. The survey memo is attached to this report as Appendix B. The responses that were received are described in this section.

The survey memo was sent to DES's Commissioner and Assistant Commissioner, four Division Directors, and 22 Bureau Administrators, for a total of 28 survey requests. Sixteen responses were received, a 57% return. Almost all responses cited more than one example or concept that does or could impede regulatory acceptance of innovative technology. Actual cases of approval or denial of innovative proposals are discussed in other parts of this report, so discussions in this section of the report will be limited to the conceptual points raised by the various respondents. The responses are summarized below by operating Division.

#### • Commissioner's Office

Lack of training opportunities for staff was noted, which is important so that staff can stay current. Delays in approvals are seen as being caused by incomplete incoming submittals, and by staff prioritizing their work loads to address better-understood matters before tackling a non-routine item such as an innovative proposal. It was noted that staff are expected to process permits in a timely manner, so additional time demands for out-of-the ordinary submittals can be daunting. For management, staff time demands mean money demands, and resources are limited. The need to get the right information from applicants, and the need to be creative in getting the information was noted. Management pointed out that staff have, on balance, little incentive for advocating an innovative proposal, in that there is no reward for success (beyond praise) but there are consequences for failure - additional staff time to fix the failure, criticism from the public, etc.

In the laboratory testing field, it was noted that EPA sometimes prohibits use of certain new testing methods while EPA is using the new method themselves and admitting that the new method is superior. Immunoassay testing was specifically mentioned in this regard. Improvements in laboratory practices are not reflected in updated EPA regulations or guidance. Apparently the rulemaking process at the Federal level is sufficiently ponderous that EPA is unwilling or unable to do the nearly continuous changing of regulations this would require.

The frustration felt by the regulated community as they try to deal with a myriad of regulations coming at them from multiple sources was recognized.

#### Air Resources Division

A respondent from the PCB program, which is in this Division but governed entirely by Federal rules, noted that regulations seem to be written by people with no actual experience in the field being regulated, are not written clearly, and are promulgated piecemeal. Regulations written for specific problems are used to cover all areas or situations. Field inspector actions are limited by the regulation, with no discretion to exercise common sense. Staff over-specialization is noted as a problem.

Another respondent noted that multiple and conflicting standards are applied to sources of air emissions. Operational and emission limitations sometimes conflict. "Grand fathering" clauses can act as a dis-incentive for older facilities to install state-of-the-art equipment, while these older facilities probably are just the facilities that most need the best equipment. Focus on one contaminant at a time is seen as hindering gains in total efficiency, i.e. reductions in total emissions for a facility. Regulations are simply too complex. The state is trying to address these issues, but rule-making is slow.

# • Waste Management Division

Many items impeding regulatory acceptance of innovative methods were noted by respondents from this division. Current waste management rules contain disincentives for recycling. For example, a Small Quantity Generator of hazardous waste - less than 100 kg per month - is subject to many fewer regulatory requirements than a Full Quantity Generator who generates more than 100 kg per month. Recycled wastes, even if recycled on-site, must be included in the total volume of reported wastes. The effect of this is that an important incentive for recycling ones wastes is lost, the incentive being lessened testing and reporting costs, fees, and other regulatory burdens.

Several similar regulatory problems are noted. A lighting company may desire to take their customers' fluorescent lamps, and store them temporarily so that consolidated shipments of spent lamps can go to recycling. Unfortunately, this would require a Solid Waste Storage Facility Permit, and in order to obtain this permit, the store would have to meet many requirements which are simply not applicable to the situation. These types of regulatory problems were noted in both Federal and State rules, and are quite complex. They seem to most often relate to how various sections of the regulations effect each other for a specific project. DES, with regional groups, is trying to address these problems, for instance with the proposed "Universal Waste" rule, which would address the problem with florescent light bulbs. It is not known when any of these efforts will bear fruit.

For a state's hazardous waste program to be accepted by EPA, it must be considered by EPA to be consistent with, and at least as stringent as, the Federal rules. EPA is seen as being excessively rigid in interpreting "consistency," limiting DES's perceived ability to amend and/or interpret the rules. Staff and management in this Division apparently feel that if they move off the narrowest possible interpretations of the rules, EPA will countermand them. Unfortunately, the narrowest interpretation may not always be the most protective of public health and the environment.

One theme that was repeated several times was that there is no opportunity for flexibility to tailor permit requirements to the specific needs of a specific facility. Excessive permitting requirements lead to parties not applying for permits which could allow wastes to be utilized in a more beneficial manner.

Lack of timely response to incoming requests and applications is noted as a disincentive to regulated parties in that if it takes years to get a question answered, applicants will be less likely to advocate changes, even where improvements can clearly be made.

Being prevented (by other State agencies) from writing rules that allow the exercise of professional judgement and contain sufficient flexibility to address different situations, and even being forced to include excess specificity, are problems mentioned in the State rule-making process. This is a major problem in the eyes of DES administrative staff from all Divisions.

#### • Water Division

The need to fund "back-up" projects, which would be a replacement for a failed innovative system, was noted. Funding for these back-up projects was included at one time under an

"Innovative/Alternative" program under the Clean Water Act, but that grant program has expired. Establishing which party assumes the risk of, and liability for, failure is important. Increased demands on staff time to review innovative proposals was noted. It was noted that the regulated party seldom has an incentive to undertake projects which perform better than the minimum regulatory requirements.

The need for additional staff training was noted. In the absence of training to remain current, staff runs a risk of approving an action which is not understood. Money for this additional training has been difficult to come by.

In addition to resource limitations for DES staff, there is also a resource limit for the applicant. A small company, town, or individual may not have the ability to develop the data that the reviewer needs to assess the application.

Two anonymous responses were received. These responses did not include any substantive remarks, so they are not included in the notes above.

Common themes among DES respondents included the need for additional training, the lack of sufficient staff resources to adequately address innovative proposals, and excessive rigidity by other government agencies that DES must work with (especially the State administrative rule-making procedure) and sometimes by DES itself.

# 3.4 Other State Regulating Agencies

Environmental agencies in nearby states were contacted to find out what these agencies are doing regarding review of innovative technologies. These contacts were arranged through the New England Interstate Water Pollution Control Commission (NEIWPCC) and Northeast States for Coordinated Air Use Management (NESCAUM). These comments may not necessarily reflect official policy at the agency in question, but may reflect the personal interpretations of the actual people contacted. The discussions are summarized below, organized by state.

#### Connecticut

Connecticut's Department of Environmental Protection (CDEP) does not have a separate program for innovative technologies. Contacts reached at CDEP indicated that lack of reviewable data is the major problem with innovative technology proposals and that applicants are sometimes unwilling to provide a full data package. They noted that there are several reasons to look into the details of a proposed technology (i.e., not to just rely on end performance), such as checking for operations and maintenance problems and for mistakes and oversights. Proposals for modifications to existing facilities are considered easier to assess since testing of an innovative unit can often be done in parallel with existing units.

An interesting example of regulatory acceptance of innovative technologies was mentioned. This regards discharges from municipal sewer treatment plants in Connecticut. During the mid-1980's, problems with water quality in Long Island Sound came to the public's attention. Studies found that significant volumes of the deep water in the Sound were becoming anoxic each summer, and found that the major anthropogenic cause of this was discharges of nitrate from municipal sewer treatment plants. The public wanted this problem solved. Because the public accepted the need to solve the problem, state grant funds were made available to municipalities who then, under CDEP's review, placed pilot denitrification units

at their treatment plants and observed performance and costs. Consulting engineers and the municipalities were given free rein to address this problem. The CDEP representative stated that a pro-active public information campaign was very important to the success of this program. Other problems have been identified with water quality in Long Island Sound - toxics, pathogens, and floating debris, but the nitrogen problem is the one being addressed mostly through technological fixes.

In a broader sense, CDEP also noted that their pollution prevention program has been playing an important role in breaking down barriers to innovation.

The Connecticut Department of Public Health regulates some environmental matters. They are very interested in improving the state of the art in on-site wastewater disposal, and, with CDEP, they are actively participating in the New England Governors' Conference (NEGC)/EPA project on interstate review of innovative technologies in this field, described in Section 5.3.

#### • Maine

Contacts with Maine were somewhat brief. A representative of the Maine Department of Environmental Protection (MEDEP) stated that innovative technologies are reviewed on a case-by-case basis, that MEDEP has no specific program to address innovative technologies, and that third-party verification data is only sought when the reviewing staff has doubts. This representative saw no pressure on MEDEP to improve acceptance of innovative technologies, and saw no problem with staff resources to address innovative proposals. (8)

The Maine Department of Public Health is participating in the NEGC/EPA project on interstate review of innovative technologies in the on-site wastewater disposal field.

#### Massachusetts

The Massachusetts Department of Environmental Protection (MADEP) has recognized that regulatory acceptance of innovative technologies poses enough problems that they have instituted a system within their organization to address it. A full-time Innovative Technology Coordinator in the MADEP's Commissioner's office leads a team of full and part time coordinators in various offices at headquarters and at their regional offices. These people act as advocates for innovative proposals and try to ensure that these proposals get a fair hearing.

In addition to that program, in 1994 MADEP's parent agency, with two other Massachusetts agencies, instituted a program called STEP - Strategic EnviroTechnology Partnership. The STEP program assists start-up companies in technology verification, business and financial planning, and in permitting (10).

In the Spring of 1996, MADEP signed an amended Memorandum of Agreement with California, New Jersey, New York, Pennsylvania and Illinois. These states agreed to cooperate by accepting each other's data from technology demonstrations and verification, and to complete a pilot program in which each state would evaluate at least two technologies.

MADEP recently re-organized its management structure. One of the goals of that re-organization was to bring together programs that work on the same problems or sites into consolidated offices, breaking up the older structure of organizing by the environmental medium regulated, or by enabling legislation. They feel that this has helped innovative technologies gain regulatory acceptance more efficiently.

MADEP recently entirely revised the program that regulated on-site wastewater disposal. The new regulations, known as Title 5, include a provision that if a given technology can show that it performs at least as well as a standard septic system, it shall be approved for use. That approval can have conditions. MADEP must publish and update a list of approved systems. The standard septic system is defined, but its performance is not. This particular fact is currently causing MADEP some difficulty, as one vendor is taking legal action against MADEP. This vendor has argued successfully (as of August, 1996) before an administrative law judge that they do not need to submit any performance data for their innovative product until MADEP supplies them with hard performance numbers for a conventional system. These numbers are not available, as historically on-site wastewater disposal systems have been governed by design standards, not performance standards. Variability in sites, wastewater make-up, and maintenance actually performed, make gathering such data a daunting task.

MADEP was one of the original driving forces behind the NEGC/EPA project on interstate review of innovative technologies in the on-site wastewater disposal field.

In contaminated site clean-up, MADEP has an unusual program. They have essentially privatized the process. "Licensed Site Professionals" (LSPs) in the consulting community take the responsibility of bringing contaminated properties to regulatory end-points defined by MADEP. A certain percentage of sites are audited by MADEP for compliance with their requirements. This effects the use of innovative technologies in that the individual LSP must have enough familiarity with a technology to take the liability associated with its use. MADEP does not have opportunity to comment and make suggestions at intermediate stages, as occurs in other state's programs.

This program theoretically allows LSPs to behave entrepreneurially by using innovative technologies for investigations and clean-ups, using their own judgement. However MADEP's experience is that the LSPs, faced with personal liability, are most often quite conservative in their choice of methods. MADEP has addressed this problem by sponsoring trade fairs where vendors show and discuss their site characterization and clean-up technologies to MADEP personnel and to LSPs.

#### • New Hampshire

For completeness, some notes on New Hampshire's programs are included here. New Hampshire DES strongly encourages the use of innovative technologies to accomplish environmental goals. This is clearly stated in the *DES Strategic Plan*, and based on the work of this project, seems to be generally reflected in action. DES has advocated for the use of innovative technologies, as is seen in the PSNH Merrimack, Somersworth Municipal Landfill, and Lee Circle Mobil cases considered in this report, and DES's participation in the New England Governors' Conference/EPA Interstate Regulatory Cooperation Work Group. DES does recognize that there is always room for improvement. This project represents a DES effort to identify inappropriate barriers in its practice of which it may not have been aware. As reflected in the recommendations, this project may lead to on-going programs to further assist acceptance of innovative technologies. To date, only one DES program has rules describing acceptance of innovative technologies, the on-site wastewater disposal program. Additionally, the program covering larger-scale, municipal, wastewater disposal has proposed rules describing a process for review and acceptance of innovative technologies.

DES's drinking water program has been following a consistent process for reviewing innovative treatment technologies and has also been participating through the Association of State Drinking Water Administrators in the new protocol in the drinking water field, which is described more fully in Section 5.3.

DES's Pollution Prevention Program actively promotes the use of innovative industrial technologies which reduce or eliminate pollution.

DES's air program took a significant step towards improving acceptance of innovative technologies in 1996. NH House Bill 1325 made certain modifications to RSA 125-C to allow DES to enter into formal agreements allowing applicants to implement "..innovative environmental measures not otherwise recognized or allowed under existing laws and rules...if those measures achieve (performance)...which equal or exceed those required.."(11) However, it is interesting to note that the regulated community has not taken advantage of this opportunity. The text of this bill is attached as Appendix D.

By State law, all New Hampshire regulations must be re-adopted periodically. Currently, the Solid Waste regulations are undergoing review for re-adoption. Options for amending the State Hazardous Waste Rules to expand the use of limited permits in the hazardous waste program are being examined. (See Section 2.4.4)

#### New York

The New York Department of Environmental Conservation's (NYDEC) air program was contacted. The contacted party reported that they address innovative technology applications through performance testing - if the item does not work, it has to be replaced. Their permits include language that requires such equipment replacement when the original, innovative, equipment does not perform up to standard. He noted that where there is a higher risk to the environment, they tend to require more supporting data. He saw no pressure on their agency to improve acceptance of innovative technologies, and saw only occasional and temporary problems with staff resources to address innovative proposals.

In the RCRA D (solid waste) program, NYDEC appears to be more active than other states in the region in issuing "Beneficial Use Determinations" (BUD's), which allow re-use of a waste material. They have issued several blanket BUD's allowing re-use of specific materials for specific purposes without project specific review. (12)

New York is one of the states that ran a medical waste tracking system for some time, beginning after highly-publicized incidents of medical wastes washing up onto East coast beaches. As part of that program, a protocol for testing medical waste treatment technologies was developed, and the New York Department of Health still issues approvals of medical waste treatment technologies using third-party testing which follows that protocol. (13)

#### • Rhode Island.

The Rhode Island Department of Environmental Management (RIDEM) indicated that they see little pressure for adoption of innovative technologies, outside of the on-site wastewater disposal field. In this field, pressures have arisen out of a need to address water quality issues in certain environmentally-sensitive coastal habitats. Dense residential development in these areas has led to water bodies becoming overloaded with nitrogen compounds originating from wastewater disposal. RIDEM is trying to help citizens and local governments address this problem, mainly through facilitating the placement of better treatment and disposal systems and through organizing maintenance districts.

RIDEM has new septic system regulations in 1996 which set up a system of approval for innovative technologies. This particular program is notable in that it has separate approval steps for technologies

which are experimental, for those which have had limited field applications, and those which have been more widely used, but not are not yet considered "standard." (14) A problem with this new program which recently arose is that in two categories there is a requirement for several years of monitoring data from existing installations. Where such data is available, they have not found an instance where more than one year's data was available.

A contact at RIDEM's air program noted that innovative technology proposals can pose temporary pressures on staff time, but did not think there was a major problem with this.

RIDEM has recently re-organized its management structure, adding an Office of Technical Customer Assistance. This office performs functions in the areas of public information, pollution prevention, small business assistance (as mandated in the Federal Clean Air Act), and permit application assistance. Enforcement functions have been separated from regulatory and other functions. RIDEM indicated that assuring funding for a back-up, conventional, project is the largest problem associated with innovative technology applications.

RIDEM was one of the agencies that led the effort to establish the medical waste treatment protocol mentioned in the New York section, above. RIDEM is issuing technology-specific approvals of medical waste treatment technologies using that protocol.

#### Vermont

Vermont's Agency of Natural Resources (VTANR) relies heavily on the consulting community. Applications that come to them from an established consulting firm tend to be viewed more favorably. Their opinion is that the consultant's review forms a third-party review step to help prevent inappropriate submittals from reaching their offices. Their own focus is on finding solutions to problems, and they noted that they are more willing to be flexible and innovative to address an existing problem, as opposed to an application for an entirely new facility. They cautioned against confusing "innovative" with "cheap."

VTANR noted that an innovative proposal can put pressure on staff time. They feel limited in their resources in that they do not have the time to do research to check on innovative proposals. They expect the consultants to do this, and they place liability there as well. They indicated that they could possibly share risk and liability, but only in the context of reducing existing environmental threats. They felt fairly strongly that basic research is not a state government role.

VTANR has recently assisted some parties in technology demonstration in wastewater treatment and disposal. They provided some assistance to Ben & Jerry's Ice Cream and the City of South Burlington with constructed wetlands, although they did not review a scope of work due to a lack of staff time. There is an on-site wastewater disposal demonstration project going on now in the Lake Champlain area. This particular area has soil conditions that make ordinary systems difficult to use, so VTANR is assisting in a project involving full scale testing of several different innovative systems.

VTANR has some experience with water discharge trading. One applicant at Lake Champlain was allowed to trade phosphorous discharges at a point discharge against improvements in land management practices leading to reduced non-point phosphorous discharge. In this case, balancing the discharge masses was difficult, and there are doubts as to how this will be managed over the long term. They noted one important limit in water discharge trading, a toxicity limit. No matter how many credits a discharger can obtain, the area at the end of the pipe must not become toxic.

VTANR's drinking water program noted the use of performance bonds to finance replacement systems where an innovative system fails.

VTANR's air program mentioned an effort by NESCAUM in the late 1980's to get catalytic controls specifically recommended for co-generation plants. In the event, turbines were found to produce cleaner air effluent. This led to issuance of performance-based permits, with conditions requiring a change of equipment to catalytic treatment if performance testing for the installed unit showed that it did not perform acceptably.

Section 3.2 contains some notes on how Vermont has permitted drop-off centers for household-generated hazardous waste.

# • Washington

As part of the NEGC/EPA interstate project regarding on-site wastewater disposal, some contacts were made with the Washington State Department of Health. They have, described in their rules, a Technical Review Committee comprised of local health officials, and private sector representatives. This Technical Review Committee reviews new innovative technologies for on-site wastewater disposal, and produces advisory opinions to the Department of Health with proposed guidelines for the use of the innovative technology. By limiting their output to advisory opinions, it is felt that members' liability is protected (15).

#### 4. OBSERVED BARRIERS TO INNOVATIVE TECHNOLOGIES

#### **4.1 Summary of Stakeholder Inputs**

This section contains a summary and analysis of information received from the various stakeholders to the environmental regulatory process. Although some anonymous DES responses were mentioned in Chapter 3, they are not included in the analysis in this section.

After several meetings of the IT Committee, by September, 1996, the original draft list of barrier types, which can be found in Appendix B, had been modified to the list shown in Table 3.

# Table 3 Revised List of Barriers To Innovative Technologies

- 1. Information flow
  - a. General
  - b. Lack of trust in government by public & developers
  - c. Lack of trust in developers by government
- 2. Administrative problems
  - a. Excessive rigidity
  - b. Unpredictable administration (short-term unpredictability)
  - c. Unpredictable regulatory environment (long-term unpredictability)

- 3. Language conflicts
- 4. Barriers written into laws or regulations
- 5. Lack of verified performance data
- 6. Risk aversion

To avoid confusion, these categories are defined here.

Category 1, information flow, includes general communications problems, for cases where information just did not get where it had to for any reason; and 1.b. and 1.c., where it seemed trust, or <u>willingness</u> to communicate, was an issue.

Category 2 relates to administration of government programs. 2a, excessive rigidity, is intended for cases where there was no willingness to use the full body of regulation to find a way to accomplish a goal, for cases where **process** has become more important than **outcome**. 2b, unpredictable administration, is intended for cases where there was a lack of consistency, or where unanticipated requirements arose <u>during</u> a review process. 2c, unpredictable regulatory environment, relates mainly to the issue of governments unexpectedly changing the rules.

Category 3, language conflicts, is for cases where one party is using language that is not understood by other parties. For instance, technical language can conflict with legal language or marketing language can conflict with technical language. This type of conflict can be characterized as a "linguistic disconnect between subcultures." (16)

Category 4 is intended for the type of barrier that is actually written into regulations or legislation, whether intentionally or unintentionally.

Category 5 is for cases where reliable data describing the performance of the proposed technology was not available to the reviewer.

Category 6, risk aversion, is fairly self explanatory.

#### **4.1.1** Analysis of Case Studies

Each of the case studies discussed in Section 3.2 are listed in Table 4. For each case, a judgment was made as to which of the barriers listed in Table 3 appears to apply. Further, barriers that applied to each case were assigned to "major" or "minor" categories.

This first analysis is summarized in Table 5. Total barriers and major barriers are both tabulated.

Observation of Table 5 leads to several preliminary conclusions. First, Category 2c, unpredictable regulatory environment, does not appear in any of the cases. Next, it is noted that language conflicts is in first place with the most total barriers and the most major barriers, while unpredictable administration, risk aversion and lack of verified performance data are tied for second. However, excessive rigidity was seldom (one of five times) found to be a major barrier. Lack of verified performance data, unpredictable

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administration, and risk aversion are each far more likely (seven of nine times) to be a major barrier whenever they are found. Barriers written into regulation are cited only once, but this instance is also a major barrier.

"Risk aversion" is a difficult category to make judgements about. It is not clear how to tell the difference between proper professional conservatism and actual fear of anything new. It is wise to remember that for some cases, failure of a proposed technology would mean significant damage to the environment and public health.

It also appears that Category 3, language barriers, is quite similar to Category 1, Information flow, as they both represent breakdowns in full and frank communication.

The barrier categories were then re-arranged to reflect these preliminary conclusions. Categories 1.a., 1.b., 1.c., & 3 are combined and labeled "Communication Breakdown." Category 6 is dropped, as it seems to defy analysis. Category 2c is dropped, as it seems insignificant. These changes give the analysis shown in Table 6.

Table 4
Summary of Case Studies

Name, Description	Approved? Y/N	Barriers? Y/N	Major Barriers Noted	Minor Barriers Noted
Coating Labs, Inc Proposal to start paint recycling plant	N	Y	2a, 6	5
Town of Candia - paint & battery collection	Y	Y	2b, 3	
Plymouth - Tires & concrete to make blocks	N	Y	3	2a
Plymouth - RBCs for new sewer plant	Y	N	N/A	
Nashua Household HazWaste Collection	Y	Y	2b, 3	2a
Selective Catalytic Reduction at PSNH Merrimack	Y	N	N/A	
Crown Vantage - proposal to recycle turpentine	N	Y	4	1c, 2a
US Tech Re-cycling sand blast media	Y	Y	2b	1c
Somersworth Landfill - Superfund Remedial Alternatives	Y	Y	5, 6	2a, 3
Dover Municipal Landfill - Superfund Remedial Alternatives	Pending	Y	5, 3	6
Lee Circle Mobil - innovative cleanup	Y	N	N/A	

Table 5
Barrier Frequency, First Analysis

Type of Barrier	# of times total	Rank	# of times major	Rank
1.a. Information Flow - general	0	-	0	-
1.b. Applicant doesn't trust Government	0	-	0	-
1.c. Government doesn't trust Applicant	2	3	0	-
2.a. Excessive rigidity	5	1	1	4
2.b. Unpredictable administration	3	2	3	2
2.c. Unpredictable regulatory environment	0	-	0	-
3. Language conflicts	5	1	4	1
4. Barriers written into laws or regulations	1	4	1	4
5. Lack of verified performance data	3	2	2	3
6. Risk aversion	3	2	2	3

Table 6
Barrier Frequency, Final Analysis

Type of Barrier	# of times total	Rank	# of times major	Rank
1. Communication breakdown	7	1	4	1
2.a. Excessive rigidity	5	2	1	4
2.b. Unpredictable administration	3	3	3	2
3. Barriers Written into Laws or Regulations	1	4	1	4
4. Lack of Verified Performance Data	3	3	2	3

Observation of Table 6 indicates that the most problems, and the most major problems, are in the communications breakdown category. Excessive rigidity is in second place for total barriers, while unpredictable administration is in second place for major barriers. This seems to indicate that opening the lines of communication is most important, both in terms of mutual trust, and in terms of the type of language used to communicate with a particular audience. Internal DES administrative matters seem to be significant issues.

While barriers written into laws or regulations and lack of verified performance data are not cited as often, when they are cited they are very likely to be major problems. Note that in the PSNH Merrimack and Lee Circle Mobil cases, lack of verified performance data was a problem, but it was a problem to the applicant, not to the regulator.

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It should be noted that this analysis covers a limited number of cases and may not be fully representative of the universe of innovative applications presented to DES. Nevertheless, this group of cases does begin to indicate the range of types of innovation issues that DES is asked to rule on.

# **4.1.2** Analysis of Committee Discussions and Other Inputs

Ideas that emerge from all of the various stakeholder inputs include the following:

- Most problems seem to center on the movement of information. Even where information is available, it is not always communicated effectively.
- Reliable data which verifies and describes a technology's performance, from a party other than the technology's developer, is a key need.
- Since innovative technologies, as a class, have a higher probability of failure than conventional technologies, arrangements for a back-up plan in case of failure is very important.
- DES, probably like any state's environmental agency, is limited in its discretion by EPA and other agencies. Within DES, waste management officials are especially concerned about EPA oversight being too rigid.
- The overly prescriptive and rigid nature of the waste management rules at the State and federal levels was cited many times by DES staff and by outside parties as posing disincentives to innovation. Processes are allowed to over-ride outcomes. Excessive permitting requirements were especially mentioned.
- Most government offices are concerned about the additional pressure on already limited staff
  resources that can arise from the need to deal with innovative proposals. Lack of incentive for staff
  to advocate or approve innovative proposals was mentioned by the private sector and by regulatory
  agencies.
- There is a need for a technology clearinghouse, to inform interested parties about the applicability of different technologies and their approval/permitting status.
- Several private sector respondents noted a significant difference in their success in dealing with DES based on what individual DES staffer they dealt with.
- Technology choices rarely seem to be explicitly limited by law or regulation, but where they are, it becomes a major problem immediately.
- Interestingly, the need for better technology verification was not explicitly stated in any of the case study interviews, by any party. In several cases verification data was a key need to allow approval, but this fact was not so stated.

# **4.2 Final List of Observed Barrier Types**

Based on the information in Chapters 2 and 3, and on the analyses in Section 4.1, DES finds that the barriers to regulatory acceptance of innovative technology that exist in actual practice can be listed as

follows:

## I. Getting the Right Information to the Right People

This includes cases where a lack of trust leads to one party or the other not giving the other party all relevant information and cases where one party uses language not understood by other parties.

#### II. Lack of Verified Performance Data

This is for cases where data was not available to confirm the basic performance of the technology. It is assumed that this data must come from some party other than the technology developer. It is a basic fact that the regulator must have some indication that the technology being proposed basically works as advertised before she or he can sign an approval. It must be understood however, that verification of a technology's performance in a basic sense does not necessarily mean that it is the proper choice for a specific application.

#### III. Government Administration

This general category includes two notable sub-categories:

# IIIa. Rigid Administration

Includes cases where there is a lack of willingness to use the full body of regulation to find a way to accomplish a goal, or for cases where <u>process</u> has become more important than <u>outcome</u>. These administrative barriers were often found where one specific regulation interacted with another; the two together forming a barrier to an innovative application.

# IIIb. Unpredictable Administration

Includes cases where there was a lack of consistency on DES's part, or where unanticipated requirements arose <u>during</u> a review process.

#### IV. Barriers Written Into Laws or Regulations

This is for cases where the barriers to innovation are found actually written into legislation or regulation. Occasionally these are present because of lobbying efforts, (17) but it appears that most of these barriers are unintentional. When requirements for "proven" or "best available" technology were written into laws, the effect that this wording would have on innovation by putting the state of an art at a given time into regulations was not fully assessed.

#### V. Risk Aversion

As noted, no attempt was made to include this category in the analysis. However, it must be admitted that regulatory bureaucracies, like all bureaucracies, are very difficult to change because of the multiple levels of authority and the system of checks and balances imposed from outside the subject area. A certain caution and professional conservatism is appropriate and is in fact demanded of environmental regulators by the public. A blank refusal to consider innovative solutions where the tried-and-true just isn't working is not appropriate. Where it

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forms an inappropriate barrier, this particular problem will defy systematic cures. No rule or policy can adequately define the problem and establish a solution. This will probably always be with us, and will have to be addressed over and over again as cases arise.

## 5. SOLUTIONS TO THESE BARRIERS

# 5.1 Re-examination of the Problem

In the previous chapters a learning process is described, in which DES examined the problems associated with the acceptance of innovative environmental technologies by environmental regulators. Before suggesting solutions, the problem should be re-examined in the light of what was learned, and the necessity of taking action should be examined.

This project on regulatory barriers was initiated in response to generalized complaints on this subject that DES and other environmental agencies have heard over an extended time from regulated parties, from the State legislature, and from companies developing environmental technologies. However, the course of the work shed some doubt on the actual extent of the problem. Despite publicity for the DES project (18), the level of input received from parties outside DES was quite low. Chapter 3 of this report contains essentially all the comments received.

Basically, all parties agree that there is a persistent level of complaints. Certainly, complaining about the government in general or about government bureaucrats is a popular activity. Whether the complaints on the subject of innovative environmental technologies reflect a systematic problem is open to question.

However, DES can not claim that there is no problem, that DES processes are perfect. The point here is that a proposed solution should reflect the actual nature of the problem as closely as possible. DES staff recognizes that innovative proposals pose problems. Government bureaucracies have difficulty with the new and innovative, and where the stakes involve the quality of the environment and public health, it is incumbent on DES to do the best possible job. This means that DES must make it possible for the best possible solutions to work.

For the case studies examined, no basic structural problem was found, but rather the problems appeared to be project-specific and were based in details. The problems found may be characterized as inefficiencies in the overall environmental regulatory system rather than major break-downs in the system. Therefore, it should be understood that any improvements expected from implementing solutions to the problem of regulatory acceptance of innovative technologies will be incremental and project-specific. It should also be understood that the resources made available for solutions will be proportional to the extent of the problem.

# 5.2 Framework for Solutions

As noted in Chapter 4, most of the problems noted with DES acceptance of innovative technologies involved failures of communication or administrative processes, leading to either denial or a slow and inefficient approval of an innovative proposal. The remaining examples either did not appear to show government-based barriers, or were dis-approved on the basis of actual regulatory provisions.

This indicates a need for two types of solutions. The first solution type would involve improving communication between the parties involved and assuring that the decision makers get the right information, whether from the applicant or from other sources. Generating trust and credibility will be a

key step to implementing a solution of this type.

The second solution type would involve identifying specific regulatory requirements which are counter-productive to a specific proposal, and proposing alternative, superior, approaches to achieving the necessary environmental protection. Determining which provisions are truly counter-productive, and not merely inconvenient, will be a key step in implementing a solution of this type.

Any actions taken by DES to enhance the regulatory acceptance of innovative technologies will have to meet certain strict goals or performance requirements:

- Protection of public health and the environment must be assured. The consequences of possible failures of an innovative system must be carefully assessed, even more so than with conventional systems.
- An actual need to use regulatory resources other than the standard administrative paths must be shown. Simple inconvenience to the applicant, within limits, may not be sufficient to justify DES offering additional assistance to an applicant.
- Compliance with existing laws and regulations must be assured, but regulators must continue to strive to write rules, and work with the legislature to amend statutes, to promote flexibility in the application of particular laws to specific projects where the strict application of the law is counter-productive to environmental interests. For many projects, public involvement and acceptance will be needed. Legal assistance will be essential.
- Parties approaching DES expecting this level of assistance with proposals must be prepared to document their intentions and actions fully, and must be ready to implement a second, presumably more conventional, plan if necessary.
- DES should be willing to take appropriate risks and interpret existing law in ways that promote common sense, and maximizes environmental protection.
- DES must be prepared to commit resources to assist parties who are acting responsibly to find their way through the body of regulations. This assistance may take the form of referrals, limited research assistance, or even mediation of the competing needs of different government bodies, within DES and outside.

# 5.3 Existing Examples of Programs to Assist the Acceptance of Innovative Technologies

Since it is not necessary to re-invent the wheel, some existing government programs in the United States are described below. Hopefully, this list will be useful to people needing these services. As in Section 3.4, these comments may not necessarily reflect official policy at the agency in question, but may reflect the personal interpretations of the actual people contacted. This list should not be considered exhaustive, since new programs are starting continuously.

New England Governors' Conference/EPA Interstate Regulatory Cooperation Project.

The New England Interstate Regulatory Cooperation Project is an innovative federal state/partnership

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designed to promote the acceptance of new environmental technologies in New England and improve the competitiveness of environmental industries in the region for marketing their products in the United States and abroad.

For the first technology area, on-site wastewater treatment and disposal was selected. EPA Region I's Center for Environmental Industry and Technology (CEIT), the New England Governors Conference, Inc., the New England Interstate Water Pollution Control Commission (NEIWPCC), and the States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont, developed a model process to reduce the barriers to acceptance of innovative technologies. This approach includes: a regional technology review process to evaluate performance and cost data; a protocol that standardizes the type of information required by the states for permitting approval; a clearinghouse to gather and disseminate information; and a demonstration of the model process. The National Small Flows Clearinghouse, located at West Virginia University, is providing information management services.

A resolution was adopted by the New England governors on July 16, 1996, endorsing and supporting regional efforts to promote regulatory cooperation between the New England state environmental agencies to enhance acceptance of innovative environmental technologies. On September 20, 1996, EPA Regional Administrator DeVillars and Connecticut DEP Commissioner Holbrook announced the signing of a Memorandum of Agreement between EPA and the six New England States to carry out a one-year pilot project to demonstrate the value of this cooperative effort for on-site wastewater treatment and disposal technologies. EPA and the New England States expect to choose additional technology areas in 1997 for expanding the scope of the project. Additional information on this project can be obtained from CEIT or NEIWPCC.

• RIDEM Individual Sewage Disposal System Program.

The Rhode Island Department of Environmental Management (RIDEM) revised their Individual Sewage Disposal System rules in 1996, in part to allow greater use of innovative/alternative systems in this field in response to environmental impacts from old or improper systems in sensitive ecological areas. Apart from systems considered "standard", the new rules allow for three different classes of application to RIDEM for approval of innovative systems. Which class a system falls into depends on the amount of operating information available. For each class, there are different permit fees, and approval conditions. One of these classes of approval is explicitly for the truly new or experimental system. Additional information can be obtained from RIDEM.

• Massachusetts Department of Environmental Protection Innovative Technology Programs

The Commonwealth of Massachusetts has taken several actions to assist parties seeking regulatory acceptance of innovative technologies. A full-time Innovative Technology Coordinator in the MA Department of Environmental Protection (MADEP) Commissioner's office leads a team of full and part time coordinators in various offices at headquarters and at their regional offices. These people act as advocates for innovative proposals and try to ensure that these proposals get a fair hearing.

In addition to that program, MADEP's parent agency, with two other Massachusetts agencies, instituted a program called STEP - Strategic EnviroTechnology Partnership. The STEP program assists start-up companies in technology verification, business and financial planning, and in permitting. The first applicants have gone through the entire process, taking 12 to 15 months. They hope that this time can be reduced, soon, to four months. It should be noted that these time frames assume that government processes are the time-limiting factor, which is not always the case.

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In the Spring of 1996, MADEP signed an amended Memorandum of Agreement, under the auspices of the Western Governor's Association Interstate Technology and Regulatory Cooperation Working Group, with California, New Jersey, New York, Pennsylvania and Illinois. These states agreed to cooperate by accepting each other's data from technology demonstrations and verification, and to complete a pilot program in which each state would evaluate at least two technologies. For Massachusetts, these will be parties working through the STEP process.

MADEP recently re-organized its management structure. One of the goals of that re-organization was to bring together programs that work on the same problems or sites into consolidated offices, breaking up the older structure of organizing by the environmental medium regulated, or by enabling legislation. They feel that this has helped innovative technologies gain regulatory acceptance more efficiently.

There is some additional information on MADEP's programs in Section 3.4 of this report and in the minutes of the September 16, 1996 IT Committee meeting, in Appendix C.

• California EPA Technology Verification Program

The California EPA started its own environmental technology verification program in 1994. Several technologies have been processed by this program, including a cone penetrometer site investigation system originally developed by the US Department of Defense. This program has been accepted by other states, through the Memorandum of Agreement mentioned in the MADEP discussion, above. Additional information can be obtained from California EPA, or from the Western Governors' Association Interstate Regulatory Cooperation Working Group, described below.

• Michigan Department of Environmental Quality Demonstration Project Program

In 1994, the Michigan legislature tasked the Michigan Department of Environmental Quality (MIDEQ) to take actions to improve acceptance on innovative environmental technologies. Two notable efforts that MIDEQ has undertaken in response to this are: improved database tracking of remedial technologies used at sites contaminated with petroleum and hazardous waste which allows searching by technology, geologic setting, county or contaminant; and a program of "demonstration projects." The Demonstration Project program allows matching technologies to State-funded sites' cleanup needs and to the interests of other Michigan research organizations. (19) MIDEQ is considering extending this program into fields beyond waste site cleanup. Additional information can be obtained from MIDEQ.

• Western Governors' Association

In response to problems associated with the large number of contaminated federally owned properties in the western United States, the Western Governors' Association (WGA) began an effort in 1992 to expedite clean-up of these properties. The limitations of existing conventional clean-up technologies became a concern for this group, and they started a notable effort to examine problems associated with regulatory acceptance of innovative technologies in this field. (20), (21) An Interstate Technology and Regulatory Cooperation Working Group has grown out of that effort, which includes several states east of the Mississippi. This group of states, which includes Massachusetts, has agreed to accept technology verification data from the other states in the working group and to conduct their own technology verification efforts. The WGA's Federal Advisory Committee to Develop On-Site Innovative Technologies (the "DOIT committee"), which started the Interstate Working Group, has also assisted in setting up field demonstrations of clean-up technologies at properties owned by the US Departments of

Defense (DOD) and Energy (DOE). The DOIT committee's final report was issued as a draft in June 1996. This report, when issued as final, should be very useful to anyone interested in problems of regulatory acceptance of innovative technologies. Additional information can be obtained from the WGA, or one of the involved states.

• US EPA Environmental Technology Verification Program

The Environmental Protection Agency instituted a new program in 1995, the Environmental Technology Verification Program (ETV) program to certify or verify the performance of innovative environmental technologies that promise solutions to problems that threaten human health or the environment. The ETV program is managed as part of the President's Environmental Technology Initiative by EPA's Office of Research and Development. EPA hopes that the ETV program will substantially accelerate the entrance of new environmental technologies into the domestic and international marketplace. It will supply technology buyers, innovation developers, consulting engineers, states, and EPA regions with reliable data on the performance of new technologies. This program covers all EPA-regulated programs except Superfund, which has its own technology demonstration and verification program, described below. The ETV program has started five pilot projects to draw on the expertise of partner organizations selected from both the public and private sectors, including federal laboratories, states, universities, and private sector facilities. The ETV pilot projects are:

- Small package drinking water systems. The Association of State Drinking Water Administrators (22), with NSF International, are partners in this project. NHDES and the University of New Hampshire participated in this effort as part of a large international group of stakeholders.
- Pollution prevention and waste treatment technologies. California EPA is the main partner with EPA in this effort to verify the performance of technologies in this field. As noted above, California EPA has its own technology verification program.
- Site characterization and monitoring technologies. EPA is working with DOE, DOD, the States of Arizona and Florida, two large corporations, and the Environmental Business Council New England in this effort.
- Indoor air products. EPA is working with NSF International and the Research Triangle Institute in this field, with a stakeholder group including the University of Illinois and many private groups.
- All environmental technologies. In October, 1996, the Civil Engineering Research Foundation (CERF) was chosen to create a clearinghouse, or database, to record the performance of private sector environmental technologies. CERF currently runs similar clearinghouses for highway construction and civil engineering technologies.

EPA maintains several technology databases, which can be accessed through EPA's website at www.epa.gov. Additional information on the ETV program is available from EPA, especially the website at www.epa.gov/ord/etv. Also see the references in Appendix E of this report.

• Superfund's SITE Program

When the Superfund program was re-authorized in 1986, the federal government recognized a need for better technologies to address the problems posed by cleaning up Superfund sites. In response to this

need, EPA started the Superfund Innovative Technology Evaluation (SITE) program. The SITE program has conducted field demonstrations of emerging and developing technologies for investigating, monitoring and cleaning up sites contaminated with hazardous waste at the actual sites. EPA conducts testing of the technology, and issues a report outlining performance and cost of the test. Additional information is available from EPA, especially the website at www.nttc.edu/env/epasite.html.

# • STAT2 Medical Waste Treatment Protocol

Following incidences of hypodermic syringes washing up onto beaches on the East coast of the U.S. in the late 1980's, a program of medical waste tracking similar to the hazardous waste program was begun under EPA supervision. The medical waste tracking program has stopped, but a related effort, a protocol to test the effectiveness of medical waste treatment technologies has remained. This protocol, which is referred to as the STAT2 protocol (23), was established by a consortium of agencies, notably RIDEM and the NY Department of Health. Additional information can be obtained from those agencies, or from DES's Solid Waste Compliance Section.

# • EPA Project XL

Project XL (eXcellence and Leadership) was established by the US EPA to allow people to proceed with projects where the existing regulatory structure acts as a disincentive to the project. Project scopes are individually negotiated, with involvement from local and state stakeholders. Several dozen projects are in this program, most in the negotiation stage. EPA regards Project XL as both a regulatory relief mechanism, and as a chance for them to test new regulatory approaches.

Recently, the various states, working through the organization ECOS - Environmental Commissioners of the States - have expressed some concerns to EPA about the operation of Project XL. (24) Concerns included: EPA "...continually changing the rules and vision of XL, thus hurting credibility and creating mistrust;" one EPA office, or managerial level, negating agreements reached with another EPA group; EPA staff not showing the same level of support for XL that upper management has; and a general lack of trust and communication. The first group of XL projects has proceeded through the system slowly, with a number of selectees choosing to drop out of the XL process.

There is an XL project in New Hampshire. HADCO Corporation, with facilities in three New Hampshire towns and in two other EPA Regions, is trying to get a hazardous waste through an expedited conditional delisting process because their wastewater treatment sludge no longer has the characteristics that led it to be originally listed as a hazardous waste. Specifically, their plating etchants have been changed from a chrome/sulfuric acid base to an ammonium base. However, because this waste sludge is considered a "process waste," it must be handled as a hazardous waste regardless of its chemical properties. Fourteen months after HADCO's application to Project XL was accepted, a work plan to generate testing data that would allow EPA to judge whether or not this waste should receive an expedited conditional delisting has been agreed on by the parties. One EPA Region has dropped out, since staff in that Region could not come to agreement with the other parties involved. If and when the sludge is delisted, HADCO intends to ship the waste, under solid waste regulation, to smelters to reclaim the metals in the waste, especially copper. Note that this waste contains about 25% copper, while ordinary copper ore contains about 1% copper. HADCO generates about 600 tons of this waste a year. HADCO estimates that not managing the sludge as a hazardous waste will save about \$200,000 per year.

Additional information on Project XL can be obtained from EPA, notably the Project XL website at www.epa.gov/ProjectXL.

Minnesota Environmental Regulatory Innovations Act

The State of Minnesota passed legislation in 1996 establishing a state program similar to the EPA Project XL. The intent of this program is the same as EPA's and New Hampshire's (see below) - to allow applicants to achieve greater environmental performance by offering regulatory relief. Additional information can be obtained from the Minnesota Pollution Control Agency, or at the program's website at www.pca.state.mn.us/newinit/xlleg.html

NH RSA 125-C - "Enhanced Environmental Performance Agreements"

Apart from any programs that may be implemented as a result of this report, the DES's Air Resources Division and the New Hampshire legislature established a new program in 1996 offering regulatory relief to parties who feel that the existing regulatory structure acts as a disincentive to their project. Either greater environmental gain or equivalent environmental gain at notably lower cost must be shown. Individual "Enhanced Environmental Performance Agreements" (EEPA's) are negotiated with the Commissioner of DES. EEPA's operate in lieu of existing permits, and can over-ride existing regulations, laws, or permit conditions. The Commissioner can revoke an EEPA at any time, for any cause. The Commissioner's decision to revoke an EEPA, or not to enter into an EEPA, is not appealable. The same legislation also included provisions for air emission trading in New Hampshire. Additional information on EEPA's can be obtained either from DES or from the NH State House. A copy of this legislation is attached to this report as Appendix D.

# **5.4 Options for New Hampshire**

Functionally, it appears that the things DES can do to improve the acceptance of innovative environmental technologies can be separated into four categories:

• Assistance to outside parties making applications to DES.

Parties approaching DES with innovative technology proposals are often simply unaware of one or more items that are of importance to DES. These can include understanding the entire body of laws and regulations that governs the field, understanding how those are administered, understanding of DES's basic legal responsibilities, and understanding what a DES staffer needs in order to approve a given application. They may also be unaware of the state of the art in the field at the national or regional level. It can happen that their proposal may represent an idea which has been tried and found lacking, or an idea which is already in wide use.

Any DES effort to address these issues in order to improve the acceptance of innovative technologies will have to focus on communication or outreach. Having a single point of contact can be a key first step in clarifying communication. This contact person, who will be referred to as the Innovative Technology Coordinator (ITC) in this report, can inform applicants on the above points and serve as a source of referrals, and can help ensure that applicants get a fair and timely hearing from an otherwise very busy DES staff. Assuring timely response will be particularly important to many applicants to DES.

People trying to get DES approval of an innovative application may feel that they have not received a fair hearing in cases where the application is denied. At this time, there is no route

of appeal for people in this predicament other than re-applying or using political pressure. The DES Innovative Technology Committee may be able to serve DES and applicants as a body to hear such "appeals," although legislation would be needed to give the IT Committee any authority beyond issuing advisory opinions. Possibly, the IT Committee could provide advice to the existing appeal bodies, the Air Resources, Water, Water Resources, Waste Management, and Wetlands Councils.

• Improving DES's ability to evaluate innovative proposals.

DES staff is limited in their ability to review and/or approve innovative technologies by several forces: the press of the ordinary workload; the limits of their own personal knowledge base, or the knowledge base of the individuals that they commonly work closely with; and sometimes by administrative practices and habits.

Efforts to address these issue will have to be in several forms. Assistance in terms of staff-hours will be needed. Access to a greater knowledge base will be needed for the individual staff people, which could come either from within DES, and from without through the Innovative Technology Committee or other experts found on an ad hoc basis. In some cases more than one branch of DES, or agencies outside DES are involved in approving a project. In those cases, the differing needs of the various agencies have to be reconciled, which can be time consuming.

For both applicants to DES and for DES staff, a database of technologies appears to be a key need. This prospective database would allow searches to determine possible solutions to specific problems, to determine where and when different solutions have been used, to determine the regulatory status of technologies, and to find contact names for technology developers and at regulatory agencies for follow-up. This database's usefulness appears to increase as it becomes more comprehensive, that is, if the database only covers one town or one state it will probably be less useful than if it covered a region or the nation. Such databases are available in some programs. Examples are included in Appendix E.

Such a database could also be used to quickly develop fact sheets for use by the general public or other interested parties to either describe the range of possibilities to address specific problems, or to describe a specific technology in some detail.

• In a time when the pace of technological change is faster than the pace of legislation and rule-making, finding ways to either make the body of laws and regulations serve DES's goals or changing those laws and regulations to make this so.

DES currently reviews proposed state legislation that effects its work, and participates in the process through testimony at hearings and other efforts. DES sometimes initiates efforts to amend legislation so that DES goals can be better reached. Obviously, DES is responsible for its own body of regulations, but administrative rule-making by other bodies can effect DES's operations, especially rule-making by EPA. DES involvement in rule-making by any other agency would be limited to participation through stakeholder comments, assuming DES is recognized as a stakeholder. At this time, these efforts to not contain a clear focus on effects on technological change or innovation.

• Either as an alternative to or in addition to existing programs, DES should offer alternative or

secondary pathways to use and/or approval of innovative technologies.

For applications that clearly serve DES's goals, but which are not properly addressed under existing regulations or laws or which are discouraged by administrative practices, "secondary" pathways to approval could be provided. Examples of cases where this may be desirable include the Crown Vantage turpentine and Coating Labs paint re-cycling cases discussed in Section 3.2. Any such secondary pathway must meet the criteria in Section 5.2, including protection of public health and the environment. Since these "secondary" pathways are by definition not part of the regular flow of work, it appears that additional staff resources would be necessary to establish, and to use, these pathways. The new RSA 125-C:6-a is a good example of a secondary pathway.

Possible actions that DES can take to improve the acceptance of innovative technologies can be divided into cost and difficulty categories ranging from minimal cost to those requiring significant resources and new or amended legislation. While minimal cost items are obviously easier to implement, items that take a significant effort to implement can indicate a more serious commitment by the agency. For issues where trust and communication are important, a tangible demonstration of commitment can be very important. An impression of commitment can become self-fulfilling.

While each of the programs listed in Section 5.3 have good points, a small state like New Hampshire has limited government resources to devote to assisting innovative environmental technologies gain acceptance. Solutions which can be implemented at minimum incremental cost to the State, by partnering with other agencies, and by making greater use of work products produced by others will probably be preferred options. The University of New Hampshire is already an important partner with DES in environmental technology matters, and DES expects this partnership to continue and strengthen.

For any of the options described above, staff resources will be needed to be allocated to implement them. This could be done by re-prioritizing the work loads of existing staff or by assigning new staff - an ITC - to do this work, or both.

# 5.5 Process for Approval of New Technologies

As has been noted in this report, New Hampshire's regulatory structure currently does not include specific authorization for technology-specific permitting or approval, except for on-site wastewater disposal. Nevertheless, there are viable options available to meet the need for review and approval or certification of technology performance. These are:

- Use secondary permit pathways, as illustrated in EPA's Project XL, Minnesota's Environmental Regulatory Innovations Act and the "Enhanced Environmental Performance Agreements," which New Hampshire established in 1996 to enhance air pollution regulation. To date, DES has no experience in administering this new program, as no one has applied.
- Participate in interstate review efforts, as noted in Recommendation 5. DES is actively participating in the current New England Interstate Regulatory Cooperation Project, which is reviewing twelve technologies for use in on-site treatment and disposal of residential wastewater.
- Use an Innovative Technology Coordinator system similar to the one the Massachusetts DEP now
  uses. Many of the recommendations in this report relate to delivering the same set of services that
  the Massachusetts Coordinators can deliver. Having a single point of contact for applicants to deal

with is a feature of this system that customers appreciate.

DES understands that establishing whether or not a technology is approved, or approvable, has value to the public, to environmental consultants, and to the regulated community. The utility of a technology-specific approval, from the regulators' point of view, is open to question. A technology-specific approval would have to include caveats to the effect that application, operation, and maintenance of the technology in question at a given site may not result in achieving the desired goals. From the regulators' point of view, site-specific review and approval would still be necessary for a "pre-approved" technology.

DES is currently using all three of the above options to facilitate review of new technologies. If funding for continued use of an Innovative Technology Coordinator can be found, use of all three methods will continue through that position. If not, they may still continue to be used, by program-specific staff.

#### 6. RECOMMENDATIONS

These are the actions DES intends to take to address the problems that were identified in this project impeding the efficient implementation of innovative environmental technologies. DES understands that other states or jurisdictions will not have the same legal framework as New Hampshire. DES believes that implementation of the recommendations in this report, or similar efforts, would enhance the acceptability of innovative technologies in any jurisdiction, since the discussions and conceptual background of this report are applicable almost anywhere.

# 1. DES should continue to encourage innovative technologies.

DES's *Strategic Plan* contains clear support for innovative technologies and approaches. Lessons learned from this project and stakeholder comments (or sometimes the lack of such comments) indicate that DES has practiced a generally open attitude towards innovation in addressing environmental protection. DES has advocated for innovative solutions to address problems such as the Somersworth Landfill. DES feels that this represents a significant advantage for New Hampshire since it will both encourage more technology-based firms to do work and prosper in New Hampshire and more importantly, result in solutions to environmental problems that are more cost effective and/or more environmentally effective.

This particular recommendation generally concerns management and staff attitudes and policies and does not represent significant additional DES resource needs. No additional rule-making or legislation is needed.

This recommendation addresses all of the identified barriers.

# 2. DES should provide some new, or augmented, services to its customers.

DES staff recognizes that innovative proposals pose problems. Government bureaucracies have difficulty with the new and innovative, and where the stakes involve the quality of the environment and public health, it is incumbent on DES to do the best possible job.

Staff functions to improve services to customers and to ensure that the best possible solutions to problems are implemented by improving the acceptance of innovative environmental technologies, can be divided into three categories of work to be done: assistance to outside parties making applications to

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DES; assistance to DES staff in evaluating these proposals; and, finding ways to either make the body of laws and regulations serve the public better by supporting DES's goals or changing those laws and regulations to make this so. These proposed services are also discussed in Section 5.4.

These services should be coordinated closely with two existing DES non-regulatory programs, the Pollution Prevention program in DES's Waste Management Division and the Small Business Technical Assistance program in DES's Air Resources Division. The services offered by these programs, together with the services proposed here, make a comprehensive package of customer assistance services.

Additionally, as part of these services, DES should continue to support the Green Technology Forum, a group of New Hampshire business people which has been meeting to share knowledge on environmental and regulatory matters. DES envisions quarterly meetings, each about two hours long. These meetings could cover subjects such as research by the University of New Hampshire or others, availability of funding for start-up ventures, or demonstrations of new products. These meetings could coincide with meetings of the IT Committee. (See Recommendation 9.) DES would serve as a facilitator for these meetings.

This work can be coordinated by a single person, or Innovative Technology Coordinator (ITC), similar to the Small Business Technical Assistance program. Having a single point of contact can be very important to applicants to DES, and to DES staff who may need assistance to evaluate proposals. A single person devoted to this work may be better able to do research to verify applicant claims or find information for the staff actually reviewing an application. A single person, not within the existing programs, may also be in the best position to view problems from outside jurisdictional boundaries and administrative practices to reconcile differing needs in order to accomplish a specific goal of implementing an innovative solution in a timely way. Currently, requests for approval of an innovative technology have to be addressed by staff on a low-priority basis. An ITC could identify where such requests need to be addressed more quickly, and do what is needed to accomplish this.

This work could also be done by existing staff by re-prioritizing their work loads slightly. This is how innovative proposals have been addressed by DES so far. Staff teams are assembled on an ad hoc basis to address problems as they arise. While this can be a slow process, it has worked fairly well.

Additional funds, and possibly State legislation, would be needed to place a permanent ITC position in DES. Federal funds should be pursued if available, but at present EPA may not have funds available for this work. The new Performance Partnership agreements between EPA and the states may allow for funding this work.

This recommendation addresses identified barriers I. III. IV and V.

# 3. DES should make increased efforts to secure flexibility in application of federal regulations and national programs.

Regulations and guidelines written for the national scale can not anticipate all variations in circumstances or technological change. However, DES's authority to interpret federal guidance to address New Hampshire's unique problems is limited. DES is currently working with EPA and other states to implement improvements in this area, and DES should continue to make every effort to secure the needed flexibility to address New Hampshire's problems in the most efficient and environmentally protective way.

Methods of accomplishing this include the new "Performance Partnership" arrangement with EPA, and/or expanding the use of "Enhanced Environmental Performance Agreements," as defined in RSA 125-C:6-a, to include projects regulated under DES's waste and water programs. Use of the Enhanced Environmental Performance Agreement is an untried method since no one has applied to use this new program, but it seems to be a good, and available, approach to providing secondary pathways to approval for technologies not known in existence when a law or regulation was written.

Other methods that can be used in a more flexible administration of environmental programs include so-called "soft landing" enforcement strategies, where violations that are not judged to be substantive, or reflect problems only associated with start-up of a new device, are not met with full enforcement efforts; increased use of research-and-development and emergency permits as defined in solid and hazardous waste regulations; and "Supplemental Environmental Projects", which are currently used in conjunction with more traditional enforcement efforts to produce compensating environmental gains where there has been environmental damage attributed to a specific party.

There is a limit to the amount of flexibility that can or should be granted by the federal government in these matters. There is a valid concern that if the various states are simply allowed to do as they please, there will be a patchwork quilt of regulation with great inconsistencies between states that could have severe and unforeseeable effects on interstate commerce.

Developing new regulatory policies as called for in this recommendation can continue to be done on a program-specific basis with coordination coming from the Commissioner's office, or coordination of these efforts can be assigned to an ITC.

This recommendation addresses identified barriers III and IV.

# 4. DES should use the state rule-making process most effectively to avoid unnecessary limits on the exercise of professional judgment.

The current state rule-making process can require excessive specificity in definition of terms and conditions, limiting DES's ability to respond to changing conditions and new problems and solutions. The current process attempts to create rules that apply to all of the people in the same way all of the time. Unfortunately, it is impossible to write a fair or reasonable rule of universal applicability, and it is impossible to anticipate all of the possible reasons why adjustments should be made to the way the rule is applied. In environmental regulation, as in other areas of the law, it is essential to the achievement of fair and reasonable results that the people making the decisions be allowed to exercise discretion and common sense.

Solutions are available, however, which can be used more broadly. The use of "functional equivalency" in the current New Hampshire Solid Waste rules is an example of the type of concept that has successfully been used in administrative rules to allow proper use of professional judgment. As an example, DES has recently allowed the use of certain fibrous wastes from the manufacture of recycled paper in landfill caps, using the "functional equivalency" provision. The use of this sort of concept and terminology should be encouraged.

This work can be accomplished by existing DES enforcement and management staff, with or without input from an ITC.

This recommendation addresses identified barriers III and IV.

# 5. DES needs to ensure that staff, regardless of funding source, have access to technical training to keep abreast of new methods in their field.

In a world where technology, and therefore the range of solutions available to solve a problem, changes significantly over short time frames, DES staff needs to be able to keep abreast of developments in their fields of work.

The risk that DES, and the state, incurs if this can not be done can become significant. Staff needs to understand, in some detail, the proposals that they are asked to rule upon. It is fairly common to see proposals to use methods that did not exist when a staffer was in college. In fact some whole new classes of problems (contaminated sites for example) have arisen over the last twenty years that were simply not addressed in the college curriculum as recently as the 1970's. If staff can not adequately review proposals, they are faced with the choice of approving something they don't understand, or not approving it simply because of the lack of understanding. The first choice is obviously risky, while the second choice forms a de facto barrier to innovative approaches. In this context, it should be understood that information supplied by the applicant can not be the only source of knowledge used. Independent and unbiased (to the extent this is possible) information must be relied on to make important regulatory decisions. DES staff will not issue a denial simply due to lack of understanding, but delays caused by an extended search for information can form a de facto barrier.

A greater effort should be made to ensure that staff has the means to keep abreast of technical developments in their fields. This is explicitly called for in Objective No. 7-4 of the *DES Strategic Plan*. All programs, whether state or federally-funded, should include training costs in their budgets. Additional funding may be needed to accomplish this goal. Low or no-cost services from the State University system or other sources may be available and should be pursued. Costs to DES would include making up the work that would have been done during the staff time spent actually in training, although it is hoped that this loss will be made up by more efficient work following the training. Management support for the staffers receiving the training will be important. Changes in State personnel rules may be desirable, for instance to enhance the importance of on-going training to an employee's advancement.

This recommendation addresses identified barriers I and V.

# 6. DES should continue to support changes in federal hazardous waste regulations.

EPA is currently considering several changes to the framework of hazardous waste regulation. The proposed new Universal Waste and Contaminated Media rules and proposed changes to the Hazardous Waste Identification Rule, among others, should have the effect of allowing new industrial and site clean-up technologies to be used in a field where the conventional technologies are not adequately meeting environmental goals. These changes are specifically contemplated to allow pollution prevention, recycling, and clean-up work to proceed where it is currently inhibited by the existing rules. The Crown Vantage turpentine recycling case described in Section 3.2 of this report is especially illustrative in this regard.

Each of the proposed rule changes is quite detailed, and it is beyond the scope of this report to describe them in detail. Further information can be obtained from DES Waste Management Division, from EPA, or from non-governmental groups interested in this field.

DES has supported these changes, and should continue to do so. DES support must focus on improving

environmental protection rather than simply on reducing burdens on regulated parties. However, it must be understood that, when done properly, accomplishing the latter can result in accomplishing the former.

The work of supporting these changes could continue to be done by DES management. Review and/or coordination by an ITC may be desirable. This recommendation addresses identified barrier IV, and to a lesser extent, barrier III.

# 7. DES should continue to support and participate in existing and future interstate efforts to improve acceptance of innovative technologies.

DES is currently participating in several interstate efforts being managed by EPA and other organizations, such as the New England Governors' Conference in on-site wastewater disposal and the Association of State Drinking Water Administrators in the field of drinking water treatment. DES should participate in similar efforts, such as the Western Governors' Association's (WGA) Interstate Technology & Regulatory Cooperation Work Group, working in the field of hazardous waste clean-up.

DES should continue to enter reciprocal agreements with other States' agencies where appropriate. For instance, there is currently a reciprocal agreement between California, Illinois, Pennsylvania, New Jersey, New York and Massachusetts, working under the WGA group mentioned above. They have agreed to accept each others' approvals of site investigation and cleanup methods, and to do their own technology verification. DES could benefit by joining this group. Conducting its own technology verification program is probably beyond DES's means, but it may be possible to participate in this effort in other ways, perhaps in partnership with the University of New Hampshire. One interesting point about the WGA effort is that the federal government has paid for member states' expenses.

The actual DES staff who would participate in any interstate cooperative efforts could be either chosen on a program-specific basis, to be done in addition to duties already performed, or by an ITC . This recommendation addresses identified barriers I, II, and V.

8. Means should be found to allow DES to hire outside experts on an ad hoc basis to help DES evaluate innovative applications, where this is mutually acceptable to DES and the applicant.

While some innovative technology applications are simple, others are quite complex. For the more complex cases, DES sometimes finds it necessary to seek advice on innovative technologies from outside the agency. Specialized consultants, hired on an ad hoc basis, can address this need.

Legislation could clarify DES's authority to do this. This would be similar to authority granted to the state's Site Evaluation Committee, which works on siting energy facilities. Following any necessary legislation, a program governing procurement of consulting services will have to be developed.

In practice, when the need for technical assistance becomes evident, a consultant expert in the specific field must be located. If the applicant to DES is willing for DES to hire an ad hoc consultant, and if the particular consultant is willing to work for DES, and assuming that there is no conflict of interest, a contract would be negotiated. Alternatively, a list of pre-approved consultants could be generated, and a retainer contract with these people or firms established. There may be legal questions to be resolved before this option could be used. The applicant would be expected to pay for DES's consultant, as is the case with the Site Evaluation Committee. Compliance with State laws regarding procurement of professional services must be assured.

This work could be done by program-specific staff in addition to existing duties or could be done by an ITC. Legal advice will be needed. This recommendation addresses identified barriers I and V.

# 9. The existing DES Innovative Technology Committee should be retained to advise DES on technology matters.

The Innovative Technology Committee has been very helpful in assisting DES in identifying actual regulatory barriers to innovative technologies. The IT Committee can fill an on-going role by serving as a sounding board for DES staff and applicants and by providing DES an increased knowledge base and advisory opinions on technology-related applications where DES staff is unfamiliar with the proposed technology, or where there are concerns about the risks posed by possible failure of the proposed technology. This would be a useful option for cases where DES staff needs assistance, but the use of a consultant is not necessary. With Recommendations 2, 8, and 10, this provides staff with a full spectrum of assistance possibilities.

The IT Committee could also be a resource for applicants to DES, to review DES decisions where applicants feel that a proposal has not received a fair hearing, or to assist the process where personalities or other intractable issues are impeding progress. While DES does not see a need at this time, potentially legislation could be sought to give the IT Committee authority to become an administrative appeal body. Another possibility is for the IT Committee to provide advisory opinions to the existing administrative appeal bodies, the Air Resources, Water, Water Resources, Waste Management, and Wetlands Councils.

To address liability questions, opinions of the IT Committee would probably be expressed as "advisory opinions," as is done by the Washington State Department of Health Technical Review Committee and the New England Interstate Regulatory Cooperation group.

DES anticipates that the IT Committee would be used on an as-needed basis. DES also intends to explore combining the efforts of the IT Committee with the Green Technology Forum. Staff support would have to provided by DES, either by existing staff or by an ITC. This recommendation addresses identified barriers I, II, and V.

# 10. DES should establish an explicit network of staff experts in specific technical fields to act as internal consultants.

Currently, individual staff people rely on their own personal knowledge and the knowledge of their immediate supervisors and other people they work regularly with. The total DES community of about 440 people represents a far wider knowledge base than this. Many staff people have knowledge and experience in areas not reflected in their current title or job duties. Access to this broader knowledge base could be very useful to DES staff reviewing applications involving innovative methods.

To implement this recommendation, a list of staff expertises must be generated and periodically updated. Staff people with questions would either contact people on this list directly to find the desired expertise, or referrals would be made by their supervisor and/or though an ITC. Work load questions for the staff expert in question would have to be worked out with that person's supervisor. It can be expected that each consultation will involve small time commitments on the part of the staff expert.

This program could be implemented by DES supervisors, but there is a need for overall coordination. Coordination and updates of the expert list could be handled by the current DES management structure,

or it could be done by an ITC. This recommendation addresses identified barriers I and V.

# 11. DES should establish a database of innovative technologies.

The need for such a database came up several times in stakeholder comments. A technology database would serve two classes of customers: first, DES staff could use this proposed database to learn where, or if, a proposed technology has been used in the past either to answer questions from the public or to assist the review of an application; and second, interested parties outside DES - the consulting and business communities and the general public - could use this database to learn about the existence, applicability, and regulatory status of technologies to help them address problems that they face.

This prospective database would allow searches to determine possible solutions to specific problems, to determine where and when different solutions have been used and under what conditions, and to find contact names for technology developers and at government environmental agencies for follow-up. Such a database could also be used to quickly develop fact sheets for use by the general public or other interested parties to either describe the range of possibilities to address specific problems, or to describe a specific technology in some detail.

This database's usefulness increases as it becomes more comprehensive, that is, if the database only covers one town or one state it will probably be less useful than if it covered a region or the nation. The new national effort by EPA's ETV program and the Civil Engineering Research Foundation (CERF) may fit this need very well. Other program-specific databases currently exist. Some of these are listed in Appendix E. At this time, it does not seem necessary to generate a new New Hampshire-specific, database. This particular conclusion should be re-visited if the CERF effort does not bear fruit.

Even without generating a new database, some work is needed to assure access to an existing database for DES's staff and customers. This work effort will mostly involve DES computer support staff. General oversight of the effort could be by existing DES management, or by an ITC. Internally, database access would be through DES's LAN system. Externally, access would probably be handled by linking through DES's internet connections. Some staff time would be needed to educate staff and to assist the public with the use of the database or databases. Fact sheets could be generated by program-specific staff on an as-needed basis, or could be done by an ITC. This recommendation addresses identified barriers I and II.

#### 7. SUMMARY

While commercialization of new technologies in any field is difficult, the heavily regulated environmental marketplace can be a more difficult field in which to bring innovations to market. Society has not reached a consensus on how to deal with environmental risks, which tend to be perceived more emotionally than other common risks such as driving automobiles. This lack of a society-wide consensus, and the significant public health, ecological, and legal liability implications associated with environmental matters, lead to a certain conservatism in decision makers. This is expressed in regulatory matters by less willingness to take risks and in a bias for "proven" solutions. However, the very fact that environmental risks have only been addressed by society for a limited time means that there are not many "proven" solutions available.

Some problems forming barriers to regulatory acceptance of innovative environmental technology were found in actual New Hampshire practice. These are:

• Getting the Right Information to the Right People

- Lack of Verified Performance Data
- Government Administration
- Barriers Written Into Laws or Regulations
- Risk Aversion

DES explicitly understands that better technologies are needed to meet its strategic environmental quality goals and has advocated their use in several cases, as shown in this report. However, DES is faced with conflicting needs regarding innovative environmental technologies. The need for better solutions must be balanced against the need for sure solutions. Innovation is a trail-and-error process by its nature. Where errors are not allowed to occur, there will be no innovation. Where there are failures, the public will rightly take the regulators to task. Finding a balance is the challenge. The goal is to ensure the best possible environmental quality, and where standard methods are not achieving this goal, a regulating agency may have to step outside its usual practices to try a newer, innovative, method to maximize the chances of achieving the goal.

Notwithstanding DES's advocacy of innovative solutions, DES practice can be made more open to technological innovation in some ways. Some improvements are needed to lower inappropriate barriers and ensure that DES decisions are made using all relevant information and that those decisions are focussed on the goal of best protecting the environment. Areas to address are:

- Providing assistance to outside parties making applications to DES.
- Improving DES's ability to evaluate innovative proposals.
- Finding ways to either make the body of laws and regulations serve DES's goals or changing those laws and regulations to make this so.
- Either as an alternative to or in addition to existing programs, offer alternative or secondary pathways to use and/or approval of innovative technologies.

DES expects that implementing the recommendations in this report will benefit the environment of New Hampshire by ensuring that the best available solutions are brought to bear on existing problems, and to prevent new problems from arising. Additionally, New Hampshire's business community should benefit by allowing new products to come into the environmental market, and by lessening their environmental liabilities through the use of the best available methods. In both ways, the citizens and the environment of New Hampshire benefit.

# APPENDICES APPENDIX A Scope and Progress of Work

#### A.1 Grant and Work Plan

This report is funded through a grant which DES received in September, 1995 through the Environmental Technology Initiative of the United States Environmental Protection Agency (EPA). The Environmental Technology Initiative is an interagency effort led by the EPA. ETI is supporting projects throughout the United States to promote improved public health and environmental protection by advancing the development and use of environmental technologies which prevent pollution, control and treat air and water pollution, remediate contaminated soil and groundwater, assess and monitor exposure levels and manage environmental information.

The EPA office administering the work is Region 1 - New England's Center for Environmental Industry and Technology (CEIT). CEIT has been established by the Regional Administrator to support the Region's environmental businesses and to assist EPA's international efforts to improve the global environment.

The tasks outlined in the grant work plan are:

#### 1. Establish an Environmental Technology Coordinator Position within DES

The Coordinator position was established and a person was in place in October, 1995. The Coordinator reports directly to the Director of DES's Water Division, and has direct access to DES senior management.

# 2. Establish an Innovative Technology Advisory Committee

This committee (the IT Committee that has already been mentioned) was to be composed of individuals with strong scientific and technical skills from private sector groups, academia, the State Legislature, and other non-governmental groups. Letters soliciting interest were sent to various organizations in November, 1995, and Committee members were chosen in January, 1996.

It should be noted that the need for the IT Committee has been recognized for several years by the DES Commissioner, Robert Varney. He envisioned the IT Committee as serving as a source of knowledge for DES staff faced with review of an application including an unfamiliar technology. This could possibly serve as long-term reason for the IT Committee's existence. However, through 1996, the IT Committee focussed on the question of barriers to innovative technology.

# 3. <u>Identify Regulatory Barriers to the Implementation of Innovative Technologies</u>

The IT Committee worked with DES staff, the business community and other appropriate parties to identify regulatory concerns and barriers. Other environmental regulatory agencies in New England were contacted to obtain information regarding their approaches to regulatory approval of innovative technologies. Literature was researched.

# 4. Conduct Round Tables on Specific Issues

Discussions on specific issues were envisioned existing regional organizations: the New England Interstate Water Supply & Pollution Control Commission (NEIWPCC); the Northeast Waste Management Officials Association (NEWMOA); and the Northeast States for Coordinated Air Use Management (NESCAUM).

#### 5. Develop a Report on the Identified Barriers

Barriers were to be separated into categories, for example, DES-specific barriers and those that apply to "government" in general. Recommendations on methods to overcome barriers are to be included in the report. The report developed under this task may be considered to be a preliminary report. Comments on the preliminary report will help form the final report (Task 7).

# 6. Develop a Model Process for the Approval/Permitting of Innovative Technologies

This program was to focus on technologies that are ready for implementation, but which have not yet been proven. For this report, this apparently paradoxical requirement will be interpreted to mean technologies that have passed the "proof-of-concept" stage, but which have not been widely applied in the field. In this context, passing the "proof-of-concept" stage means that there exists some verifiable data from tests or demonstrations indicating that the technology can perform the indicated function.

# 7. Compile a Final Report on the Results of the Project

The report will detail the project process, findings, and recommendations for future efforts. The tasks in the work plan were to be done over a one-year time frame.

# A.2 Description of the Progress of the Work

This section contains a description of how the work plan was actually executed.

# A.2.1 Formation of the DES Innovative Technology Committee

In November, 1995, letters were sent to the organizations listed in Table A-1 to solicit members for the Innovative Technology Committee. Each organization was asked to nominate one or more of their members to participate in the work of the IT Committee. In January, 1996, letters were sent to the people that had been nominated by the various responding organizations, accepting them as members. A copy of the grant work plan, and an agenda for the first meeting was sent with this acceptance letter. The names of the people accepted to the DES IT Committee are listed in Table 1 (in Chapter 1), with the name of the organization they represent.

# A.2.2 Internal DES Survey

In early December, 1995, a survey memo was sent to all DES supervisory staff. This memo described the Innovative Technology Barriers project, and asked for their input. To initially frame the questions surrounding regulatory approval of innovative technologies, a list of categories of barriers was attached. This list was taken from a report prepared by DES in January 1995 titled *Barriers to Pollution Prevention Within a Regulatory Agency*, somewhat modified to reflect the new subject. Response by early January, 1996 was requested. A copy of the survey memo is attached to this report as Appendix B. The results are discussed in Section 3.2.

#### **A.2.3** Literature Search

Research is reflected in the bibliography of this report. Much has been written over the past several years on the subjects of "Regulatory Barriers to Technology." Editorials and opinion columns bemoan short-sighted management practices and regulations. There is a certain amount of criticism of the legal system, specifically mentioning application of strict liability laws as stifling innovation. (1)

Some editorials note that better information on the actual performance of different technologies, and independent testing to verify performance, are pressing needs. Most of all however, there are government reports.

It appears, based on the literature, that government is carefully re-examining how environmental regulation is carried out in the United States today. Most of these reports reflect considerable input from stakeholders, parties outside of government with a pressing interest in the matter. There appears to be a consensus growing that government practices do not encourage innovation in the environmental field, and may be actively anti-innovation. Most of the work going on trying to describe and address this apparent problem is in the field of hazardous waste site clean-up. The efforts of the Western Governors' Association (WGA) are particularly noteworthy for involving stakeholders and focusing on solutions.

Table A-1
Mailing List for Solicitations to Innovative Technology Committee
(In random order)

Dartmouth College Hanover, NH	University of New Hampshire Durham, NH		
Environmental Business Council of New England North Quincy, MA	Business & Industry Association of NH Concord, NH		
New England Water Environment Association Wilmington, MA 01887	NH Section, ASCE Manchester, NH 03108		
Granite State Designers & Installers Association Concord, NH	N.H. Water Works Association Manchester, NH 03103		
US Army Corps of Engineering Cold Regions Research & Engineering Laboratory Hanover, NH	New Hampshire Bar Association Concord, NH 03301		
NH Society of Professional Engineers Concord, NH	The Audubon Society of NH Concord, NH		
Society for the Preservation of New Hampshire Forests Concord, NH	Appalachian Mountain Club Gorham, NH		
NH House Environment & Agriculture Committee	NH House Science & Technology Committee		
NH House Resources, Recreation & Development Committee	NH Senate Environment Committee		
NH Senate Economic Development Committee			

Additionally, the basic structure of environmental regulation is being questioned. The current system is referred to as being a "command-and-control" system. All parties seem to agree that this system has accomplished much, but that it may have come to the end of its usefulness. Proponents of change hold that a negotiation-based, flexible, regulatory system will better address environmental problems that have not adequately been addressed to date. Others are concerned about the problem of how to fit an effective legal enforcement strategy into a new structure.

#### **A.2.4** Inter-Government Contacts

Part of the original intent of this project was to identify regulatory barriers to environmental innovation not only in New Hampshire, but on a regional basis. The original intention of round table discussions in Task 4 evolved into a series of interstate contacts, by telephone and in person. Contacts were made with other New England States through existing regional inter-government associations: the New England Interstate Water Pollution Control Commission (NEIWPCC) for water-related issues; the Northeast States for Coordinated Air Use Management (NESCAUM) for air-related issues; and the Northeast Waste Management Officials Association (NEWMOA) for waste-related issues.

DES's coordinator was not able to get onto NEWMOA's agenda until December, 1996. He did attend two NEWMOA meetings while this report was being prepared. As an organization, NEWMOA is examining problems of regulatory barriers to innovative technologies. They appear to be mainly observing, and commenting on, ongoing efforts in EPA's Superfund and RCRA programs.

NESCAUM provided contact names at the other states in the region. Their comments are discussed in Section 3.3. DES's Air Division has been working on encouraging innovation in environmental technology and regulation, being a driving force behind 1996 legislation in New Hampshire amending RSA 125-C to establish "enhanced environmental performance agreements." This is a (state) legislative equivalent to EPA's Project XL (XL = eXcellence and Leadership). These two projects are discussed in the body of the report.

NEIWPCC showed considerable interest in this project. DES's coordinator spoke at a NEIWPCC meeting in January 1996 explaining the purpose of the project, soliciting input, asking for help in the future in disseminating the results of the project, and asking for contact names for each state's environmental agency. With some assistance from NEIWPCC's staff, contact names for each state were obtained.

# A.2.5 Initial Categories of Barriers

Categorizing the existing barriers to the implementation of innovative technologies was thought to be useful to facilitate understanding of the various barriers, and to finding specific solutions to specific problems.

In an un-related effort, the DES Pollution Prevention Program produced a report in January 1995 titled "Barriers to Pollution Prevention Within a Regulatory Agency." In that report, various categories of barriers to pollution prevention were listed. There appeared to be conceptual similarities to the problem of encouraging a pollution-prevention emphasis in an environmental agency's policies with the problem of encouraging innovative environmental technologies. Therefore, the categories of barriers in that report were used as a starting point for this project. These initial categories, slightly modified to reflect the new subject matter, are found in Appendix B as part of the internal DES survey.

This list of barrier types was refined and modified as the project progressed, as is reflected in this report.

#### **A.2.6** Innovative Technology Committee Meetings

The DES innovative Technology (IT) Committee met nine times between February, 1996 and January, 1997. At the first meeting, DES's Pollution Prevention team presented the results of their work on barriers to pollution prevention, described above. Discussions at these meetings ranged from describing actual experiences with regulatory barriers to innovations, to far-ranging conceptual issues. These discussions are summarized in Section 3.1. Minutes of the meetings are attached to this report as

Appendix C.

# APPENDIX B Internal DES Survey

# **STATE OF NEW HAMPSHIRE Inter-Department Communication**

**DATE:** December 6, 1995

FROM: Robert P. Minicucci II, PE AT (OFFICE): Water Supply &

Subsurface Systems Bureau Pollution Control Pollution Control Division

**SUBJECT:** Regulatory Barriers to Implementing Innovative Technologies

TO: DES Division Directors and Bureau Administrators

**CC:** Robert W. Varney, Commissioner, DES

G. Dana Bisbee, Assistant Commissioner, DES

# **Background:**

DES has started a one-year project to examine barriers to implementing new and innovative technologies that may exist in government practices, both DES specifically and government in general. This new program (Innovative Technology - "IT") covers all DES work. I am coordinating the IT program. By this memo, I am asking for your thoughts on the subject. Please copy this and pass down to your section supervisors.

Your input to the IT program is essential. Your input is the only way that I will be able to begin to understand the matter as it affects all your different individual programs. We will also be getting input from people outside of DES through an advisory committee that should be formed in January 1996.

To set up a preliminary framework for the discussion, I have shamelessly stolen from the "Barriers to Pollution Prevention Within a Regulatory Agency" report dated January 1995 by the DES P2 program. The categories of barriers that they identified are listed below, somewhat modified for the purposes of the IT program. These categories are preliminary and subject to change.

#### Definitions:

Innovative: Something that is either new and/or unfamiliar

Technology: Includes methods, practices, machinery, test methods, etc. Should be

interpreted very broadly for the purposes of the IT program, we shouldn't limit

ourselves to so-called high-technology.

Regulatory: Related to policies, regulations, habits, anything that leads to a DES office

taking one action over another. Personalities of individuals obviously are a factor, but let's try and keep this on a professional basis, i.e. I will discard

character assassinations.

Barriers: Includes both real and perceived problems.

At this point, we should list and categorize barriers. Solutions will come later. Please feel free to offer examples of specific barriers that you see.

Responses should get back to me by **JANUARY 8, 1996**. Anonymous responses are acceptable, as long as they are legible. Of course, if you want to discuss this face to face, that's acceptable, too. Call me at 2941, I've got voice mail.

#### **Types of Regulatory/Government Barriers:**

#### A. TRUE REGULATORY BARRIERS

- 1. A specific technology is mandated.
- 2. A specific technology is prohibited.

## B. LACK OF FLEXIBILITY IN INTERPRETING STATUTES AND REGULATIONS

- 1. DES inflexibility.
- 2. Inflexibility by others, including the regulated party. However, I'm going to skeptical of anyone's efforts to scapegoat other parties.
- 3. This category includes lack of flexibility for prototypes/R&D projects and for break-in periods, on the part of any party.

#### C. INFORMATION BARRIERS

- 1. Regulated party unaware of DES needs or programs.
- 2. Difficulties in understanding cross Division/Bureau aspects of a specific job.
- 3. Lack of sufficient data from a developer, or DES effort to get that data.
- 4. Lack of marketing/communication skills for technology developer and/or DES staff.

#### D. DES INFORMATION PROCESSING

- 1. Delays
- 2. Lack of communication or mis-communication between Bureaus & Divisions.
- 3. Lack of a structure for technology-specific approvals.

#### E. LACK OF POSITIVE INCENTIVES

- 1. For DES what does a staffer get for approving something new that works? [We know what happens when it doesn't work.]
- 2. For the regulated party what do they get for trying to do better than the minimum?

#### F. ACTUAL DIS-INCENTIVES

See E, above. Are there dis-incentives for either staff or regulated parties?

# G. OTHER

Anything that you don't think fits into a category above.

#### **Conclusion:**

Thank you for your help. Again, responses by January 8, 1996. Once we have a list of barriers, we'll start working on solutions. Call me at 2941 if you want to discuss this, or if you need clarifications.

#### APPENDIX C

# **Minutes of Innovative Technology Committee Meetings**

# February 2, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of February 1, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the first meeting of the Innovative Technology Committee. The meeting started at about 1:05 on February 1, and ended at about 4:10. In attendance were:

William Daly NH Water Works Association

David Allain Granite State Designers & Installers Association

Kenneth Kimball Appalachian Mountain Club

David Borowy Environmental Business Council - New England

Michael Quinn NH Bar Association

Peter McGlew NH Business & Industry Association

H. Chandler Royce NH House - Resources, Rec'n & Development Comm.

T. Taylor Eighmy University of New Hampshire

Pamela Hall Environmental Business Council - New England Richard Levergood NH Chapter, American Society of Civil Engineers

Bob Minicucci DES
Stephanie D'Agostino DES
Vincent Perelli DES
Paul Lockwood DES
Lynn Preston DES
Robert Varney DES

Commissioner Varney opened the meeting. He spoke on the need for DES staff to have information available regarding new technologies that may be proposed to them. We hope that the Innovative Technology Committee will be able to provide technical expertise that staff may not have. He also hopes that the Committee will help us identify where we (DES) is impeding the implementation of innovative technologies, bringing in outside expertise where the appropriate. He indicated that the other New England states are very interested in that particular effort. During the following question-and-answer session, it was agreed that the Committee may become an avenue of "appeal" for persons proposing a technology to DES for cases where the developer feels that a technology has been dis-allowed unfairly. Mr. Varney also mentioned that the Committee would probably need to elect a Chairman.

Bob Minicucci then spoke on some administrative details - meetings will be fairly informal, the only ground rule, at least initially, is "no character assassinations," meetings will be recorded in summary. Bob explained the grant to examine "Barriers to Innovative Technology," and what we hope to accomplish over this spring and summer. Bob noted that a Technical Advisory Committee had been an idea of Mr. Varney's for some time, DES receiving this grant from EPA gives us the opportunity to form the Committee. Bob went through the handout materials. [Committee members that weren't present should get a copy of the handout package with these minutes. Please call me at 271-2941 if you haven't

gotten the handout package - Bob] The problem statement, the definitions, the schedule, in fact most of the material is subject to discussion and change as the Committee wants.

Bob explained that the Committee has been convened to hear what you have to say about DES practices. If any Committee member does not feel he or she can speak freely at a meeting, private meetings can be arranged, and written statements can also be accepted. Bob noted that other people have worked on the problem of regulatory acceptance of innovative technologies (see the bibliography in the handout). Bob explained that we would start by proposing categories of barriers to innovative technologies, in hopes that this would allow us to better find solutions to specific types of barrier.

Other things noted include an internal DES survey that should be presented at the next meeting and the need to understand why specific barriers exist so that we do not remove barriers that should remain in place. Meetings will be run fairly informally.

Bob then introduced Vince Perelli of the DES Pollution Prevention (P2) Program. Vince made a presentation on the January 1995 report *Barriers to Pollution Prevention Within a Regulatory Agency*. In this report, categories of barriers were proposed. The presentation was highlighted by Vince trying to make the overhead projector quieter by applying a manual impact technology. The projector did stop making noise, it also stopped making light. A replacement projector was found. Copies of that report were made available. We can get more if people want them.

Bob then presented proposed categories of barriers to implementation of innovative technology for the Committee to consider. Please note that the phrase "regulated party" is used to describe either a property owner, a business operator, a technology developer, or a consultant.

**Proposed Categories of Barriers** 

- I The "True" Barrier (A technology is either mandated or forbidden in legislation or regulation.)
  - A. Intentional
  - B. Unintentional
- II Information
  - A. The regulated party doesn't know or understand government's requirements or responsibilities
  - B. The regulated party doesn't give government all relevant information.
  - C. Government doesn't know the regulations.
  - D. The regulated party doesn't want to "open the door" to the regulators.
- III Government Management
  - A. No flexibility in interpreting regulations
  - B. Delays and excessive paperwork
  - C. No beans i.e., no management tracking/recognition of managing innovative proposals, <u>and</u> no provision in Federal grant management practices for tracking/recognition of managing innovative proposals.
  - D. General poor organization

# IV No positive incentives

A. Why should the regulated party do more than the minimum?

# V Lack of Resources

- A. Government lacks resources
- B. Government staff training insufficient
- C. Regulated party lacks resources

#### VI Risk

- A. Government fear of failure
- B. Regulated party fear of failure
- C. How to fund/arrange a back-up
- D. Third-party verification

The meeting then became a discussion session. Points raised include the following:

- The need for reliable third party testing was noted. No one is willing to entirely trust manufacturers' claims alone.
- As regulations change, the design "target" for a technology changes. Developers do not feel they can adequately predict regulation changes.
- Innovation and change for its own sake should be avoided we must always remember to maximize protection of the environment.
- Enforcement policy regarding failures/short-comings of a new technology was discussed. Options mentioned include establishing a trust fund or insurance-type financial mechanism to fund back-ups; the use of covenants not to sue; allowing exceedances in a limited way; and tying the cost of failure to the environmental risk of the failure.
- Promulgation of information was discussed. Points include publicizing government grants; letting the regulated community that government is willing to encourage innovative solutions; and making performance data (verified to some extent) on various technologies available in on-line databases.
- It was agreed that it is in a manufacturer's interest to identify where their technology is <u>not</u> applicable, as mis-use of a product can ruin a reputation or cause litigation. The reviewer is interested in examples of where a proposed innovative method did not work, limits of the technology and failures should be on the databases mentioned above.
- Allow more on-site, full scale pilot testing.
- Get financial assistance to technology developers. There is a funding gap between experimental testing and full scale commercialization.
- Publicize the existence of existing technology developers.
- Encourage technology transfers, such as from utility construction to site remediation.
- The point was raised that DES may have approved innovative methods where no adequate performance data existed.
- The inflexibility of hazardous waste rules, especially RCRA (Resources Conservation & Recovery Act) rules, was noted as a barrier to innovative technology implementation.
- A process to review and approve new technologies is needed. Presumably the Committee would play a large role.

• Perhaps the various organizations represented on the Committee could take the list of categories of barriers and make it into a questionnaire for their members.

A few examples of different instances of barriers were mentioned. Bob said that we will probably want to strike a certain balance in this. We can swap "war stories" ad infinitum, but that's not quite the point of our work. On the other hand, if no one can point out an example of a specific category of barrier, then perhaps we don't need to list that category.

After these discussions, the points raised were summarized and members were reminded of the time of the next meeting. The Committee did not want to immediately change the list of categories; we will be discussing that at the next meeting. It was decided that the Committee will not choose a chairperson at this point; we will wait until we know each other a little better. Taylor Eighmy reminded me that we needed to introduce ourselves to each other, so we did that (sorry, that really should have been first.). As noted above, the meeting broke up about 4:10 PM.

I'd like to thank you all for participating. You may have noted that I did not attribute the various discussion points. I did that on purpose, both to make my note-taking easier, and more importantly, to foster a sense of "amnesty" in the discussions. I think a feeling of amnesty will be important as discussions proceed. If you disagree, I will change.

I have taken the liberty of drafting a mission statement for the committee, in hopes that it will be helpful to keep us focussed:

The DES Innovative Technology Committee will assist the NH Department of Environmental Services in assessing new proposed technologies and further, will help DES to meet our shared goals of preventing environmental contamination and correcting existing environmental contamination by making sure that new innovative environmental technologies are implemented in a protective and efficient manner.

Comments and discussion are welcome...

I have attached a list of members with names, addresses and telephone members. Members who couldn't make this first meeting are also being sent the handout package. See you on February 22, at 1:00 PM, DES Room 112.

cc: Paul Casey, w/att
Carol Kilbride, USEPA N.E., CEIT, w/att
Edward J. Schmidt, WSPCD/DES
Victoria Jas w/att
Sen. Carl Johnson w/att
Rep. Cynthia McGovern w/att

RPM:eti\2196mtg.min

February 27 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of February 22, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the February 22 meeting of the Innovative Technology Committee. The meeting started at about 1:00, and ended at about 3:35. In attendance were:

William Daly

Kenneth Kimball

NH Water Works Association

Appalachian Mountain Club

David Borowy Environmental Business Council - New England

Michael Quinn NH Bar Association

Richard Levergood NH Chapter, American Society of Civil Engineers

Victoria Jas NH Business & Industry Association

Paul Casey New England Water Environment Association

Bob Minicucci DES John Bush DES Ken Marschner DES

The minutes of the February 1 meeting were accepted without changes.

The meeting generally consisted of discussions of various things that may or may not reflect barriers to implementing innovative technologies.

Results of an internal DES survey conducted during December 1995 and January 1996 were discussed. The results of this survey showed that there were more concerns in the waste management area, although this may simply reflect more detailed responses from DES's Waste Management Division. We discussed using this survey as an example for Committee members to canvass the membership of the various organizations represented. This will probably turn out to be an important source of data.

One issue raised quickly was confidentiality. The developer of a technology is reluctant to provide details of a new method to government for fear that the information will be made public. DES's Hazardous Waste Rules contain provisions for keeping "trade secrets" confidential. There are also apparently provisions in 5CFR for "confidential business information." I have enclosed a copy of the DES hazardous waste confidentiality rule. Please review. Is it strong or protective enough? Can or should this concept be extended to other programs?

It was noted that DES may not necessarily be concerned about the details of a process, but rather only about the output of the process. This may vary from program to program.

At one time, EPA had a program in the wastewater field that encouraged innovative/alternative (I/A) technologies. Funds were available to pay for replacement of a failed innovative solution. This program no longer exists. This program did not meet all needs. The owner of a wastewater plant, often a municipality, still has the hassle of replacing a failed innovative solution even if the financing is taken care of; and then there's the question of handling the wastewater discharge while the new solution is implemented.

It was noted that public and private clients have different needs and expectations, and we may want to consider these separately.

It was generally agreed that setting up regulations to work around "performance standards" is preferable to process-oriented regulations. It was noted that Federal Hazardous Waste regulations are moving in that direction, a new set of regulations have been proposed by EPA.

ASTM (American Society for Testing & Materials), the NSF (National Sanitation Foundation), and universities in general, were agreed to be reliable sources of third party technology verification/test methods.

Performance bonds could be used to allow for a replacement of a failed innovative system. In this scenario, there is a gap of time between a failure and the bonding company providing a solution.

Can government review of a technology be considered part of a QA/QC process? This seems to depend on one's view of the competence of the government staff in question.

A problem with waste management was brought up. In this particular case, a representative of a private entity stated that the solid waste rules are framed entirely around landfill operations; that their problem did not involve a landfill, and this caused difficulties in dealing with DES waste management staff in solving that particular problem. The presence of "functional equivalent" rules and R&D permits was noted. The private sector representative felt that there was a lack of guidance in navigating through the rules.

Inter-agency problems were discussed to some extent. OSHA and FDA were noted as effectively "vetoing" environmentally sound solutions to some problems. An example cited involved ethylene oxide, which is quite toxic. Discharge of ethylene oxide to the atmosphere is heavily regulated by environmental authorities. However, its use is mandated by FDA for certain medical uses, which therefore requires either a discharge to the atmosphere eventually or devices to prevent such a discharge. Another case were OSHA regulation effectively stopped a formaldehyde recycling process was noted.

In another case, State of NH Weights & Measures rules require operator attendance at some types of scales. This prevented a small municipality from using an automated scale system for septage deliveries at a treatment plant, which would have saved the municipality significant money while providing better data.

At this point, it was noted that we should not focus solely on failures, that we should look for successful examples of implementing innovative technologies.

Several years ago, the town of Plymouth, NH, built a wastewater treatment plant that used a method not previously used in NH, "rotating biological contactors" (RBCs). It was reported that RBCs had been used fairly widely in other places, and even that the specific engineering weakness of the system - the shafts around which the contactors rotate - had been identified. In this case, the system was given a fairly straightforward engineering review, and was approved.

Difficulties in administrative rulemaking were discussed. There seems to be some differing opinions in this matter. DES staff feel strongly that the NH Office of Legislative Services, and attorneys in general, require excess specificity in rules, that no leeway for professional judgement is allowable.

However, the world outside government feels that there is considerably more room for judgement in existing rules than DES actually uses, and that rules are used by staff were they don't necessarily apply.

There seemed to be general agreement that the State rulemaking process is not good, and that the Federal process isn't any better. It was noted that Massachusetts uses "executive orders" in some cases, that this can lead to quick changes in administrative processes.

I'd also like to note that I've recently learned that State of Connecticut officials have the authority to make minor changes to regulations by announcement only, on an annual basis. (No, I don't know what "minor" means in this context.)

DES's wastewater program has proposed rules defining a process of review and judgement for I/A technologies. I have enclosed a copy of these proposed rules, as well as the existing rules in DES's Subdivision & Subsurface System rules for review of I/A systems.

There was some discussion of the proper place, or attitude, of a regulating agency. DES tends to take the attitude that we're working in partnership with property owners and consultants to solve problems. At least one Committee member felt that this could cause problems when enforcement is needed. Separation of the "white hat" and "black hat - enforcement" regulators may be desirable; the wastewater program separates these two functions entirely. There was some discussion of whether or not it is appropriate for a regulating agency to assist regulated parties.

We went through the proposed list of categories of barriers. Some were eliminated. Item IIc, Government Doesn't Know Regulations, was eliminated by agreement. The Committee felt that if this had been a problem in the past, it was not now, at least at DES. Va and Vb were combined.

IIIc, No Beans, is a very government-specific problem relating to how Federal grants are administered. There is, or was, no credit in Federal grant administration programs for being innovative. This may be changing through a new program, "Performance Partnership Grants." Through this program, success of a program is measured by environmental indicators, e.g. tons of toxins emitted to the air or water, rather than simpler bean counting exercises, such as number of enforcement actions.

Item IId, Regulated Party Doesn't Want to Open the Door, was discussed. This applies for example, to a company that has a simple question, but fears that they may get a full enforcement inspection because they asked. The Committee apparently did not feel that this was a problem <u>in fact</u>, but may be a <u>perceived</u> problem. If that is the case, then publicity and outreach efforts are probably indicated.

Item IIIb, Delays, may or may not be a problem. DES staff had given several specific examples of DES delays that they felt had hindered implementation of I/A solutions. It isn't clear at this point what significance these have. It was mentioned that if there was a rush to get something from DES that it was the requesting party's obligation to push DES. For each of these examples, I'll have to investigate to find out the background and details.

After all this discussion, the list of categories now looks like this:

## **Proposed Categories of Barriers**

I The "True" Barrier (A technology is either mandated or forbidden in legislation or regulation.)

- A. Intentional
- B. Unintentional

## II Information

- A. The regulated party doesn't know or understand government's requirements or responsibilities
- B. The regulated party doesn't give government all relevant information.
- C. The regulated party doesn't want to "open the door" to the regulators.

# III Government Management

- A. No flexibility in interpreting regulations
- B. Delays and excessive paperwork
- C. No beans
- D. General poor organization
- IV No positive incentives
  - A. Why should the regulated party do more than the minimum?
- V Lack of Resources
  - A. Government lacks resources and/or training
  - B. Regulated party lacks resources
- VI Risk
  - A. Government fear of failure
  - B. Regulated party fear of failure
  - C. How to fund/arrange a back-up
  - D. Third-party verification

I asked about the "mission statement" that I proposed in the minutes of the February 1 meeting. Some Committee members are not comfortable with the longer-term aspect of the Committee, that is, Commissioner Varney's concept of a standing body to advise DES. One member was not prepared to commit that amount of time, another asked about the liabilities assumed by members. As no answers to those questions were available, we agreed to table the matter.

The meeting broke up about 3:35. The next meeting is scheduled for May 9. We can use the time before this meeting to canvass the members of our various organizations, and I can try to find out what was behind the specific cases of barriers noted by DES staff. The May 9 meeting had been scheduled to last all day. By acclamation, that meeting has been shortened to 1:00 PM to 4:00 PM. However, you should know that I was able to reserve more space for the May 9 meeting. If you want to invite another member of your organization to sit in on that meeting, by all means do so. Again, I'm available for private discussions if there are matters that anyone does not want to bring up before the whole committee, or in front of DES staff.

There were some discussions among members after the meeting broke up that I'd like to summarize. There was some feeling that some of these "barriers" are not, or should not, be government problems per se. There were more questions as to whether it is appropriate for DES to take a stance of actively assisting regulated parties in solving environmental problems. This may be a question of variability between the programs that DES administers, or it may be a difference of opinion on how regulating agencies ought to conduct themselves.

In some programs, the standard engineering solutions work acceptably well, and innovative solutions offer incremental improvements. In those cases, water supply and wastewater for example, there doesn't seem to be as much pressure to adopt innovative solutions. In other programs, such as contaminated site clean-up, the standard solutions don't work very well at all; there is much more pressure for innovation. Also, in some cases, the public is paying for the solution. For those cases, it may be in the public interest to make it easier to adopt innovative solutions. Admittedly, where a private party is proposing something innovative, it's generally for one reason, to save that party money. For this case, the regulator probably has to make protection of the environment the only point of judgement, the regulator probably has no responsibility towards the private party's finances.

As far as how regulating agencies ought to conduct themselves, as I think about that issue, it seems to be a question of whether government stays with "command and control" regulation, or adopts a more flexible stance. There is a general trend away from command and control. Having said that, command and control may still have a place.

I hope this last discussion has not strayed too far into editorializing, I feel these issues are important. I can be reached at (603) 271-2941 if you need me. Thank you for your continued interest.

RPM:eti\22296mtg.min

**Enclosures** 

cc: Robert W. Varney, DES Edward J Schmidt, WSPCD/DES Carol Kilbride, USEPA New England, CEIT, w/ Encl

May 13, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of May 9, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the May 9 meeting of the Innovative Technology Committee. The meeting started at about 1:10, and ended at about 3:50. In attendance were:

William Daly NH Water Works Association (NHWWA)

Richard Levergood NH Chapter, American Soc. of Civil Engineers (ASCE)

Fred Douglas ASCE

Peter McGlew NH Business & Industry Association (BIA)
T. Taylor Eighmy University of New Hampshire (UNH)

Bob Minicucci DES Craig Wright DES Cathy Beahm DES

After introductions, the minutes of the February 22 meeting were accepted without changes.

Bob discussed the IT Committee's purpose. There has been some concern about the two different purposes for the Committee's existence that have been discussed. The first is to assist in evaluating and solving the "barriers" problem; the second is to assist DES in evaluating technologies that may be unfamiliar to DES staff. DES does not feel that these purposes conflict. We do appreciate your assistance in solving the first problem and we anticipate that the Committee will be a great help in the future. We do not want to ask any Committee member to contribute any more time or effort than they are comfortable with. If any member decides to step down from the Committee for any reason, we still appreciate the effort provided.

Bob also discussed a project being run this year by the New England Governors' Council (NEGC) with EPA Region 1. This project involves regional review of new technologies for on-site wastewater disposal (e.g. septic systems). The proposed review process is that a task force of regulators from all the New England States which the New England Interstate Water Pollution Control Commission has been running for some time will act as a regional review board for a one year pilot project. This task force will review technology proposals, using a list of technical criteria now being finalized, and issue advisory opinions to the states. The states retain their individual permitting/approval rights. An information clearinghouse may also be established. This process will be formalized by a Memorandum of Agreement signed by all relevant Commissioners, hopefully this summer. The next immediate step is a meeting with private sector technology developers, to be held on May 14, to see if they perceive any value to this new process and to gather comments.

The bulk of the meeting was taken up by members' input on the "Barriers" project.

#### NHWWA:

Mr. Daly from the NHWWA reported that this project was discussed at the 4/18/96 NHWWA meeting. Technological innovation is not a big issue in water works at this time, probably because we are now in a lull between regulatory pushes. The bulk of the work associated with the Surface Water Treatment Rule is done. Mr. Daly had a copy of a "Consensus Protocol for Evaluation and Acceptance of Alternate Surface Water Filtration Technologies..." that the Western States Workgroup prepared in 1992 with EPA.

NHWWA reports that the technology market in the water works field is driven almost entirely by EPA regulations. The Surface Water Treatment Rule was a watershed issue in forcing that particular branch of EPA, and other regulators, to face issues regarding technological innovation. The next regulatory issue in water works that may require new technologies may be radon and/or groundwater disinfection. The Association of State Drinking Water Administrators (ASDWA) is currently working with EPA and the National Sanitation Foundation to establish criteria for review of package treatment

units. The newly-recognized problem of *crypto sporidium* contamination may drive some innovation, at this time the problem centers on accurately detecting *crypto*. One test method being evaluated at UNH involves gene probes. Prof. Eighmy explained what gene probes entailed, but I don't feel confident of repeating his explanation accurately.

Mr. Daly also had an draft information sheet from a new EPA program called the "Environmental Technology Verification Program." The ASDWA program mentioned above is one of the projects mentioned in this information sheet. It isn't clear what branch of EPA is overseeing this project, Penelope Hansen is listed as the Program Coordinator.

#### ASCE:

ASCE reported that the Barriers project would be published in the Chapter's June newsletter and that I could expect responses directly to DES.

#### UNH:

Professor Eighmy stated that he felt that the most important barrier by far was the availability of information, especially from a technology developer/vendor to the regulator. He offered several recent examples. There was a proposal to make ethanol from municipal solid waste. The vendor did not offer back-up information, and DES's project manager had no information to use in judging the proposal. UNH did a literature search, finding very little. This proposal has apparently been dropped.

UNH is researching questions around processing soil contaminated with volatile and semi-volatile compounds into bituminous concrete. There have been little or no scientific studies exactly what happens to contaminants while the soil is processed.

Slow sand filtration of drinking water supplies is a method that has regained popularity over the past eight years or so. This movement was not vendor driven, but was driven by the need of small to medium size water systems to comply with the Surface Water Treatment Rule. There were several pilot projects in the area, using EPA money, and review of these pilot projects has lead to greater acceptance of this technology. This process of gaining acceptability took roughly six years.

This lead to some discussion of the varying time-frame requirements for public works and industrial processes. In the modern world of "flexible manufacturing," the window of opportunity for a profitable product run may be only weeks long. At the same time, the public health implications of an in-plant process change may or may not be as great as for a large public work.

Prof. Eighmy does not feel that Government management practices are very important in impeding innovative technologies, in fact he stated that the information is <u>the</u> problem. He went on to say that the current list of barriers should be radically changed, that the current list is not weighted correctly.

## BIA:

Mr. McGlew, the BIA representative, had a question regarding how to know whether or not an air discharge permit will be required for a new activity, specifically contaminated site clean-up. Mr. Wright, from DES's Air Resources Division, replied that DES does not find this to be a technology question, but an air quality impact question, but he did offer some ideas. DES is now accepting air quality modeling done by others to show if a permit application is needed or not.

A need for flexibility in interpreting RCRA (Federal Hazardous Waste) regulations was noted. An example (un-named location in NH) was cited in which a trench to install an in-situ treatment system was being dug, and a strict interpretation of RCRA regulations meant that the soil excavated could not be backfilled into the trench where, it should be noted, it would have been treated at least as effectively as the surrounding soil. The interpretation was that backfilling the trench with the contaminated soil would be improper disposal of hazardous waste, so the soil had to be carefully stockpiled and transported for disposal off-site, at greater expense. Mr. McGlew notes that backfilling the trench would have been allowed in many other states.

#### DES:

Mr. Wright and Ms. Beahm noted that in their dealings with add-on air pollution control technologies, pre-construction meetings are held, and that performance testing is specified in an operating permit. This permit can contain clauses that require the permittee to place a more standard solution in place if a more innovative solution does not perform as expected.

They feel that they have not had trouble getting information from vendors and consultants.

The rules governing air pollution have provision for existing sources to get waivers to deadlines when proposing an innovative solution - innovative being defined as not fully demonstrated but can attain better results than the standard reasonably available control technology.

DES contacts with agencies at other New England States was discussed. Massachusetts has re-organized its Dept. Of Environmental Protection to move away from single media regulation. They have placed innovative technology advocates at various bureaus at both headquarters and at the district offices. Through UMASS, they have established a technology testing and verification process.

In waste site cleanup, Massachusetts has privatized most of the decision making. This has had effects on the acceptance of innovative cleanup technologies, since the individual consultant can bear the liability of failure. MA DEP is addressing this by holding small trade shows to make the consulting community more familiar with new cleanup technologies. Massachusetts is working with the Western Governors' Association to improve acceptance of waste site cleanup technologies.

The Vermont Agency of Natural Resources reports that they rely heavily on their consulting community. The word of a known consultant carries much weight with the VT ANR. They also noted that they are much more willing to be flexible where an existing problem has to be addressed to protect public health, as opposed to proposals for new facilities. They noted that "innovative" can mean simply "cheap," which can be a problem.

Vermont's air pollution program reports that there are no current problems with acceptance of innovative technologies.

The State of Connecticut reported a recent successful program at municipal sewage treatment plants of introducing new de-nitrification methods. This was in response to public concerns about water quality in Long Island Sound. In this case, public concern lead to a willingness to spend public (mostly State) funds to find innovative solutions to a problem.

Connecticut's Industrial Pre-treatment (sewer) program coordinator noted that lack of information

from the regulated party is the major barrier to technology acceptance, and that the regulated party was sometimes unwilling to provide information. He noted that proposals for new discharges are the most difficult to evaluate, since it isn't possible in these cases to split the wastewater flow to allow protected testing. He also noted that really new processes are rare, it's much more common to see modifications to known processes.

On balance, none of the Connecticut contacts felt that there was a problem with acceptance of innovative technologies.

Outside of the septic system field, Rhode Island reports no problems with acceptance of innovative technologies. With septic systems, there have been problems with nutrient overload in coastal ponds, which tend to attract dense residential development. RI is developing regulations which describe a three-tier acceptance process for on-site wastewater treatment and disposal methods which may be experimental, new to field application, or new to RI.

Maine DEP and New York's air program report that they have no problem with innovative technology proposals.

These interstate contacts would seem to indicate that there is not much difficulty with getting government approval of innovative technologies. However, Prof. Eighmy noted that there is a certain amount of complaining in the private sector about acceptance of innovative technology, so the results of these contacts may represent bureaucratic defensiveness as much as anything else.

In discussions, the Committee indicated strongly that we don't know enough yet to finalize a list of barriers that we need to propose solutions for. Some items need to be cut out. Everyone felt that communication of information is a key, or <u>the</u> key issue. Examination of case studies seemed to be the preferred next step. I will be working on this. I may ask Committee members to contact regulated parties, so that we have a better chance of getting honest and open responses.

Other items briefly discussed included enforcing performance standards, in that legal enforcement is very demanding of staff time. Penalties need to be proportional to risk. For regulated parties that can document a good-faith effort to comply, a "soft-landing" enforcement strategy may be appropriate. At this point in the discussion it was noted that enforcement strategy by government can affect the regulated party's willingness to try an innovative solution that may offer benefits to all parties.

A need for demonstration sites was noted. It was also noted that New Hampshire tends to attract small, entrepreneurial (and therefore more innovative) firms. To maintain the much-quoted "NH Advantage," we may want to be sure we do not needlessly discourage innovation.

As one final note, GZA GeoEnvironmental (our ASCE rep.) has posted a news item about the Innovative Technology Committee at their website www.gzea.com. More information may get posted through their home page, or DES's. I will speak with DES management this week about this.

The meeting broke up about 3:50. The next meeting is scheduled for **Thursday May 23, 1:00 to 4:00** at **DES room 112.** I look forward to seeing you there. I can be reached at (603) 271-2941 or E-Mail at rpm2@des.state.nh.us if you have questions or comments. Thank you for your continued interest.

RPM:eti\5996mtg.min

cc: Robert W. Varney, DES Edward J Schmidt, WSPCD/DES Carol Kilbride, USEPA New England, CEIT

May 29, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of May 23, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the May 23, 1996 meeting of the Innovative Technology Committee. The meeting started at about 1:10, and ended at about 2:10. In attendance were:

William Daly NH Water Works Association (NHWWA)

Richard Levergood NH Chapter, American Soc. of Civil Engineers (ASCE)

Peter McGlew NH Business & Industry Association (BIA)

Michael Quinn NH Bar Association

Bob Minicucci DES

I started the meeting with some miscellaneous items. The National Sanitation Foundation is holding a meeting for regulators on July 9, 1996 to discuss the process of review and approval for innovative on-site wastewater disposal (septic) systems. Barring unforseen bureaucratic difficulties, I will be attending. I will also be making a short presentation about the DES Innovative Technology (IT) program at the Connecticut RiverFest on June 22. DES has begun the process of getting the IT program its own webspace on the internet, under the DES home page. (Please forgive me if I'm using the wrong prepositions. I'm not clear on how one describes these virtual spaces.)

Ken Kimball from the Appalachian Mountain Club couldn't make it, but he had telephoned in some comments, which I read. He offered criteria for judging whether an innovative proposal ought to be approved: does the innovative method work at least as well as the standard solution; is it a long-term or short-term solution to the problem at hand; and what are the life cycle costs, O&M costs are especially important. He also reminded me to consider the purpose of innovative solutions - to reach our goals more efficiently. He agrees that getting proper information to the regulator is key.

There is no new input from member organizations, but more is expected soon. The June ASCE newsletter includes an article on the IT program, with my phone number and E-mail. BIA has sent out a survey. Mike Quinn plans to bring up the IT program at the next Bar Association meeting.

As you may recall, at the May 9 meeting the need to examine actual case studies was brought up. Between the meetings, I examined the results of the DES survey from last winter. Many of the problems

tabulated as "actually seen" are case studies, so I got a list together of rejections and approvals of "innovative" proposals. This list is attached. The committee members present took up the job of interviewing the "regulated contact" for each case; I will interview the DES contact.

The meeting broke up about 2:10. The next meeting is scheduled for **Thursday June 27, 1:00 to 4:00 at DES Room 112.** I look forward to seeing you there. At that meeting, I hope to be able to review all case study interviews and input from the organizations. The next meeting after that is **Thursday August 8, 1:00 to 4:00 at DES Room 112.** By the end of the August 8 meeting, we will need to have our list of barriers to innovation finalized, and a list of proposed solutions established.

To summarize the Summer schedule:

June 27 Member Organization Input

Case Study Results

Establish and Prioritize List of Inappropriate Barriers

Partial draft of report should be available (introductory chapters, etc.)

**August 8** Finalize List of Inappropriate Barriers

**Establish List of Proposed Solutions** 

Start discussion of "Model Approval Process"

I see the report and the "Model Approval Process" being firmed up in September with the final product out in October 1996.

I can be reached at (603) 271-2941 or E-Mail at <a href="mailto:rpm2@des.state.nh.us">rpm2@des.state.nh.us</a> if you have questions or comments. Thank you for your continued interest.

RPM:eti\52396mtg.min

Attachment

cc: Robert W. Varney, DES
DES Division Directors, w/Att
Carol Kilbride, USEPA New England, CEIT, w/Att

July 3, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of June 27, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the June 27, 1996 meeting of the Innovative Technology Committee. The meeting started at about 1:10, and ended at about 3:05. In attendance were:

Pamela Hall Environmental Business Council - New England (EBC)
Richard Levergood NH Chapter, American Soc. of Civil Engineers (ASCE)

Peter McGlew NH Business & Industry Association (BIA)

Michael Quinn NH Bar Association

Bob Minicucci DES

I started the meeting with some miscellaneous items. The DES IT program has gotten some press recently, in the NH Environmental Monitor and in the NH Business Review. Members noted that the Environmental Monitor is always willing to print. items. I made a short presentation about the DES Innovative Technology (IT) program at the Connecticut RiverFest on June 22. I will be attending a National Sanitation Foundation meeting for regulators on July 9, 1996 to discuss the process of review and approval for innovative on-site wastewater disposal (septic) systems. DES is still working on getting the IT program its own webspace on the internet, under the DES home page. A news item has been posted about this program under GZA GeoEnvironmental's home page on the web. (Rich Levergood works for GZA.)

We then moved on to input from member organizations. Peter McGlew, for BIA, read some information he got from three businesses. I've attached copies of the faxes/letters form these firms, so I won't try to summarize them here.

Michael Quinn had mentioned this project at a recent Bar Association meeting. His comments back to us focussed on the perceived problems with the State rule-making process. He said that as a result of recent (1995?) Legislation, the basic guidance document for State rule-making is being rewritten. This could give DES an opportunity to change the process in ways that address an often-heard complaint: that we are not allowed to make rules that allow the exercise of professional judgement and flexibility.

Pam Hall, for the EBC, had little member input, but she had sent out a questionnaire to members. She has received some initial response indicating a need for greater out-reach on DES's part, and a need for a central information source (clearinghouse) on environmental technologies and their acceptance by government bodies.

EBC has also gotten a grant from CEIT in the area of innovative environmental technologies. This grant is referred to as the "Golden Opportunity" program, and relates to the commercialization of environmental technologies. DES is working with EBC to do a joint presentation at a meeting in September of this year. There is a "Golden Opportunity" seminar on July 11 at MIT on the subject of creating a financial strategy for environmental firms.

Rich Levergood, for ASCE, provided a copy of the June NH Chapter news letter, which contains a copy of the DES information sheet on this program. Neither Rich nor I have gotten any E-mail or anything else in response. Rich also had a copy of an article from the April 1991 issue of *Civil Engineering* magazine titled "Fear of Trying," which discusses difficulties in getting innovative methods approved at Superfund sites.

We then moved on to discussing case study interviews. I'll try to set out here what was said about each case.

#### 1. Coating Labs, paint re-cycling

Mr. DeLois did not return calls. Members of his staff indicated that Mr. DeLois was not happy with DES. I'll reserve comment about what the DES contact had to say until we can hear from Coating Labs.

## 2. Crown Vantage, turpentine recycling

There was a lot of discussion on this case. Crown Vantage (formerly James River, the big Berlin paper operation) produces low quality turpentine as a by-product of its processing of trees. They wanted to use this turpentine as a fuel on site, in a lime kiln. Mr. Danforth at Crown Vantage apparently had quite a bit to say about this case. Points that Mr. Danforth made include:

- a. Regulators are inflexible in interpreting regulations.
- b. He sees a variable response from DES depending on what <u>person</u> he gets at a particular time.
- c. He feels that the rules are impossible to comply with.
- d. He feels that managers have no flexibility as to who they assign to a given project.
- e. He says that DES is doing good work, that dissemination of information is lacking.
- f. He feels that this "Barriers" project is well-meaning, but that there will be no follow-up.
- g. He feels that the more junior the staff, the more time lag there is in response.

I was encouraged to call Mr. Danforth for more information.

I had interviewed a DES party about this case. DES response to Crown Vantage was that a full RCRA permit was required to burn this waste turpentine as a fuel. There are provisions in both the State and Federal rules stating that when a waste is re-cycled by burning for energy recovery, it shall be considered a waste throughout. Therefore, waste handling permits are required. Since this waste turpentine is a "hazardous waste" under the rules, a full RCRA permit is required to recycle it. Some materials are allowed to "exit" the waste rules when recycled by burning, turpentine from wood products is not one of them. This restriction is in the Federal rules as well as the State rules. Unfortunately, this restriction has led to this turpentine being disposed of (legally) as a waste rather than recycling it, since Crown-Vantage decided that the trouble of getting a full RCRA permit was greater than any possible gain from the recycling.

## 3. PSNH Merrimack, selective catalytic oxidation.

See attached 'fax. I'm not sure if PSNH's comments relate to the Merrimack case, or to dealing with government in general. I haven't been able to pin down the DES party for an interview.

#### 4. Lee Circle Mobil

See attached notes from Mr. DeAngelo. The DES project manager reports that an innovative clean-up method was sought with Mr. DeAngelo's cooperation, because this site was not getting cleaned up using the standard methods. This site is considered high-risk because of heavy groundwater use for drinking in the area. A 72-hour pilot test was run using a "dual-phase extraction" method, which removed about as much gasoline from the ground as three years of standard methods had done. The pilot test was considered a success, so per

rules established by the NH Petroleum Remediation Funds (the "ODD Fund"), the remediation was bid out. After the bids were in, a losing bidder approached Mr. DeAngelo proposing a different cleanup method. DES stuck with the bid process. This little conflict resulted in some delay. Cleanup is now proceeding fairly well.

#### 5. Dover, Tolland Road Landfill, Superfund site

The City of Dover indicated that the City and some of the other PRP's ("potentially responsible parties," Superfundish for "people that have to pay") went out specifically looking for bright ideas that would allow the PRP's to meet their responsibilities while spending less money. Once a reasonable looking idea was found, they then had to sell the other PRP's on this idea, and then sell EPA. At this time, they are working on convincing EPA that their idea can work. Apparently, their idea is to actively use biology to control contaminated groundwater associated with this landfill, and possibly also to modify the cap design to allow for greater beneficial biological activity in the landfill itself.

This site is under EPA control, as opposed to DES. A Consent Decree was established in 1992 laying out a conventional clean-up involving capping the landfill and extracting contaminated groundwater to control the dissolved plume.

When I interviewed him, the DES contact said that the PRP's were meeting their legal deadlines in the consent decree. He said that there had been no formal alternative proposal by the PRP's, but many discussions. He said that "everyone is playing it too close," that EPA won't say what they want, but he feels that the PRP's are being fairly open. One problem he sees is that the and EPA always bring attorneys to the meetings, so there is no way to conduct a technical discussion. He notes that all these proposals are costing DES and EPA staff time, which is significant in that cost recovery by both agencies is capped by a Consent Decree. He states that we are approaching that cost cap.

#### 6. Somersworth Landfill, Superfund site

See attached notes from the City Engineer. DES contacts indicate that DES agreed to this method before EPA did, and that DES had to work hard to get EPA to accept the innovative proposal. The DES project manager feels that an appropriate solution was reached for this site, but that it will mean that we'll have to spend time screening out all sorts of unusual clean-up proposals in the future. Like the Dover-Tolland Road site, this site is led by EPA, not DES.

For both of these Superfund sites, I plan to send questionnaires to the EPA project managers soon.

After the case study discussions, I presented some technical questions to the committee regarding some problems that DES is facing.

First, at the Fletcher Paint Superfund site in Milford, PRP's are proposing a thermal clean-up technology that is quite new. Questions that we have include:

- Is the thermal conductivity of soil actually predictable within a factor of 2 as the PRP's claim?
- Does the coefficient of diffusion, which governs transport at the micro-level driven by a

concentration gradient, actually vary significantly with temperature?

Second, several towns around the State are having trouble meeting ammonia discharge limits at lagoon-type sewer treatment plants during winter months. Can anyone give us information on nitrification of municipal wastewater in lagoons under cold conditions, i.e. lagoon temperature <4C?

The meeting ended with some discussion of outreach for the Barriers project. I can go to your organization's meetings and present the program, discuss what we've learned to date and most importantly, listen to what people have to say.

The next meeting is on **August 8, 1996 at 1:00 PM.** At that meeting I hope to:

Wrap up case study discussions Finalize and prioritize inappropriate barriers Start list of proposed solutions Start discussion of "Model Approval Process"

I see the report and the "Model Approval Process" being firmed up in September with the final product out in October 1996.

I can be reached at (603) 271-2941 or E-Mail at <u>rpm2@des.state.nh.us</u> if you have questions or comments. See you in August, and thank you for your continued interest.

RPM:eti\62796mtg.min
Attachments
cc: Robert W. Varney, DES
DES Division Directors, w/Att
Carol Kilbride, USEPA New England, CEIT, w/Att

## August 12, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of August 8, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the August 8, 1996 meeting of the Innovative Technology Committee. The meeting started at about 1:05, and ended at about 3:20. Attending were:

Pamela Hall Environmental Business Council - New England (EBC)

William Daly NH Water Works Association
Taylor Eighmy University of New Hampshire

Kenneth Kimball Appalachian Mountain Club [attending by telephone]

Kenneth Colburn DES, Director Air Resources Division

#### Bob Minicucci DES

As usual, I started the meeting with some miscellaneous items. The handout package includes a outline of the report that I'll be writing on "Barriers to Innovative Technology," and information on several programs that are currently in place trying to help people get quicker acceptance of innovative technologies. Those of you who weren't at the meeting are getting the handout package attached to these minutes. EBC is running a seminar on "A Roadmap to Environmental Technology Verification" in Manchester on September 5. This will be at the SEE Science Center on 324 Commercial Street, from 7:30 to 12:00. This seminar will be repeated at Bryant College in Smithfield, RI on September 6. Our Barriers project will be shown at these seminars. A UNH professor, Bill Joslin, will be making a presentation on the recent resurgence of an "innovative" drinking water treatment method that has been out of favor for much of this century.

We then moved on to case studies. Just like last time, I'll try to present what the applicant party told the Committee member, and what the DES party told me.

# 1. Town of Candia, Paint and Battery Pickup

Candia had a recent problem with permitting a paint & battery pickup facility, and a dispute over the closure of an old landfill. Candia noted a lack of flexibility at DES, a parochial attitude, and a lack of staffing. They felt that the problem was solved politically. What I got from the DES staff was somewhat different. Candia filed a permit application (for the paint & battery collection) in 1991, which got lost. The problem was found out in 1995 and given to a staffer to fix up. He, in his words, "went to the Town with his hat in his hand," and began negotiations to fix the problem. A permit was issued in late 1995 or early 1996. Beyond the paint & battery permit issue, there was an additional issue that arose at this time about the closure of an old Town landfill. The Town says it was done correctly, DES had no information. This could be the issue where the political figures weighed in. Test pits have been dug, quite recently, to determine the adequacy of the closure.

#### 2. Town of Plymouth, Casting Tires Into Concrete Blocks

The Town made a verbal proposal to DES to encapsulate used tires in concrete to make large blocks. These blocks could be used for retaining walls, to restrain sand and salt piles, etc. This forms a proposal to re-use a waste product, which requires DES review. The Town says that they are waiting for a DES response. The Town also stated that DES did not have resources to help communities. The DES party described the same project, but he said that DES was waiting for the Town to propose something in writing. The DES party (a supervisor) did say that at the time of the proposal, DES was worried about environmental effects from used tires, it was just after the large Danville tire pile fire. He went on to say that if the Town made such a proposal now, there wouldn't be any problem with it, as DES has learned more about the impacts of used tires.

#### 3. Town of Plymouth, RBCs for Sewer Treatment

This case involves the proposal, approval and construction of the existing sewer treatment plant six or seven years ago. This plant uses Rotating Biological Contactors (RBCs). This technology is fairly well established at the national level, but not in New Hampshire. The Town said they felt they had to jump through more hoops than necessary to get this plant approved, and that DES did not have a positive attitude towards RBCs. The DES party painted a slightly different picture to me. A legally required "Facilities Plan," an engineering planning report on the Town's wastewater disposal problem, was filed,

in which the use of RBCs was recommended. This particular Facilities Plan was an updated report, following a report done five years before. The earlier report recommended use of a technology (extended aeration) which has since been found to not work as well as desired. DES reviewed and approved the updated facilities plan. Many reviews were required, and public hearings held. Apparently, all these reviews and hearings are required by law. For instance, the State Historical Preservation Office, Fish & Game, and the Army Corps of Engineers must review Facilities Plans. DES also noted that RBCs had fallen out of favor for a while due to a specific design flaw, which has apparently been addressed.

# 3. US Technology, Recycling used Sand Blast Media

US Technology wrote to the State, initially to the Attorney General's Office, to determine if their process of cleaning and re-using plastic beads used to "sand-blast" painted surfaces was allowable in New Hampshire. DES's final determination was that their proposal was OK under the rules. It took DES two years to reach this conclusion. US Technology comments were on regulatory agencies in general, and focussed on the need for the applicant to be a "pest" - his word - and keep pushing. He cited turnaround in regulatory staff, and both lack of training and experience, and lack of understanding of the applicant's position, on the part of regulatory staff. He noted that regulatory staff does not want to take risks in decision making, and feels that Department heads could set a tone for a more active staff attitude. He felt that getting the right individual to review a proposal makes a lot of difference. He noted that US Technology had submitted proposals to 35 states, some had given no response at all, some had said that they "don't recycle." He stated that he was not dissatisfied with DES overall. The DES staffer described a similar process. From his point of view, this matter was assigned to him as a low priority job. He had to determine how this proposal fit in the rules, determine if this constituted recycling, or treatment & disposal under the rules, build a consensus between the solid and hazardous waste regulators, and then sell the determination to management. There were telephone calls between DES and US Technology, leading to US Technology supporting additional information. Strictly speaking, the letter that finally went out was not an approval. Rather it was a rule interpretation. He noted that this is not the type of work that the EPA grant supporting his position allows, so it had to be done on a low-priority basis.

## 4. Nashua Household Hazardous Waste Pickup

The City of Nashua wanted to build a facility where citizens could drop off household-generated hazardous waste, such as used oil, paint and thinners, automotive or cleaning products and so forth. They wanted to do this because people were pouring the stuff down the drain or putting it in with the regular trash, neither of which is a desirable outcome. (I should note that hazardous waste generated by a household is not regulated under State or Federal Hazardous Waste rules.) A DES planner contacted the City about the possibility of grant money for this purpose. The City decided to pursue this. DES originally told them that a Solid Waste Permit was required. Some time later, the Attorney General's Office (AGO) became involved, and said that no, a Hazardous Waste Permit was required. The City said that DES "bent over backwards" - their words - to help. They noted the waiver provisions in the waste rules, apparently saying that this option could have been used but wasn't. Communication between DES and AGO was a problem. They have their permit, which is a double permit under Solid and Hazardous Waste Rules, and the facility started operation earlier this month, but the process took three years, far too long. The DES contact told an almost identical story. Apparently, the Waste rules as written simply did not anticipate this sort of situation, and many interpretations of rules and statutes were needed. He said that the City was patient and responsive. He did say that, in hindsight, the AGO was brought into the process later than they should have been. He also said that this sort of facility has been permitted in other states (VT for example) far more easily.

This was the last of the case studies, so discussions moved on to the subjects of what barriers to innovative technology have we actually found, and what do we need to do about them.

I got the discussion started by saying that the press our project has gotten and outreach by DES and Committee members has generated no response at all from the general public. My initial interpretation of this, and my first reading of the mass of case studies, is to (tentatively) conclude that DES does not have a structural anti-innovation problem, but that case by case, office by office, and statute by statute, constant care is needed to be sure that we're not unreasonably blocking out new solutions.

One Committee member noted that he felt that DES needed an advocate, or ombudsman, (we never lit on a proper title for this) to assist applicants find their way through the regulatory process.

Another noted that this adds cost for DES, and can cause internal problems. He pointed toward HB 1325 [in your handouts] as a better solution.

Another Committee member pointed out that we need to build some sort of synthesis out of the case studies and determine if there really is a problem that needs to be addressed. Yet another member felt the most pressing need was for a clearinghouse of information where people can find out what technologies are applicable to a certain problem, and what technologies have been approved in different jurisdictions for different purposes. I said that some such clearinghouses existed, program or industry specific. I'll have to list the ones I know of in an appendix to the report.

One person proposed a sort of statutory fix that would require regulators to look beyond the rules to some greater goal where a given situation does not fit the existing rules.

I pointed out that the handout package contains several example programs of how different government bodies have addressed this problem. For instance, the STEP program from Mass., is to assist smaller companies commercialize their products. In addition, Mass DEP has an established network of Innovative Technology Coordinators to help staff and outside applicants. The Committee responded that they would like to hear from them, so I agreed to invite the head Coordinator, in their Commissioner's Office, to our next meeting. {Note: I E-mailed Claire Barker, the MADEP Innovative Technology Coordinator, Friday afternoon inviting her to our next meeting.}

At about this point, the discussion almost became a debate as to whether a new regulation is needed to ensure that innovative technologies get a fair review, or if administrative/policy fixes are more appropriate. The admin./policy fix side basically focussed on attitudes of individual DES staff - looking to get policy in place to encourage flexible thinking, saying that regulations alone won't fix the problem. The regulation fix side said that focusing on administrative processes alone would lead to a report that only criticized individuals, and the message would get lost. The question was asked if this Committee is interested in arbitrating DES attitudes, and the answer was unanimously no.

One member noted one of the handout documents - the ASDWA/EPA "State Alternative Technology Approval Protocol." He said that something like this could be appended to (an amended) House Bill 1325, and that a set of regulations can give the applicant business a road map on how to proceed. The ASDWA/EPA protocol lists the information that an applicant must present to allow a good technical review. I said that this protocol was set up almost identically to the New England Governors' Council program for regional review of septic system technologies.

A suggestion was made to use an amended HB 1325 to legitimize the need for a regulation, or to require DES to make regulations.

The question remains of what, exactly, is the problem? It - why do environmental regulators accept innovative technologies so slowly and reluctantly - does not appear to be really one problem, but a set of behaviors and attitudes that have to be addressed one at a time. We also have to remember that applicant technologies that don't look like they'll work should not be approved. A new technology should either promise better performance, or equal performance at a lower cost. There was general agreement on this point.

I went through the proposed report outline, pointing out a few sections that seemed relevant at the time. Section III.E points out that, in NH at least, we very seldom actually permit technologies, rather, we permit sites and applications. When asked about a proposed new method or application, we try to see how it fits in with the rules, and make an interpretation, as in the US Technology case outlined above. This sort of letter could be characterized as a "letter of non-objection." This letter would say, more or less, "based on the information you sent, if you apply this method carefully, you might not have a problem." For things which are not covered by existing regulations, it is difficult to go beyond this. However, a list of approved technologies can have value to the general public, and to a party marketing a technology.

The original list of barrier categories probably doesn't apply any more. Although I didn't label it as such, V.B lists the categories that seem relevant now.

At this point, someone proposed getting a draft report out soon. This draft might act as a straw horse and have the effect of generating outside comments, which have been notably lacking up to now. I said I should be able to have a draft of some sort out to Committee members about a week before the next meeting, on September 16. This was all right with everyone.

Regarding synthesizing the case studies that we've looked at, I will look them all over this week, and try to determine exactly what sort of barrier, if any, is indicated. I will distribute the results.

To allow the writing chore to proceed, I would appreciate any comments you may have on the draft outline or the case study synthesis, by the week of **August 26**.

The next meeting is scheduled for **Monday, September 16 at 1:00 in DES Room 112.** At that meeting we should:

Wrap up case study discussions, and any lessons learned Hear from MA DEP's Innovative Technology Coordinator Discuss the draft report Discuss what action to propose to address barriers to innovative technology.

I can be reached at (603) 271-2941 or E-Mail at <u>rpm2@des.state.nh.us</u> if you have questions or comments. See you in September, and thank you for your continued interest.

RPM:eti\88796mtg.min
Attachments: Report Outline

EPA Project XL information NH House Bill 1325, as passed in 1996

Information on a Mich. "Demonstration Project" process Information of Massachusetts' "STEP" program ASDWA/EPA "State Alternative Technology Approval Protocol"

cc: Robert W. Varney, DES
DES Division Directors, w/Att
Carol Kilbride, USEPA New England, CEIT, w/Att

## September 20, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of September 16, 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the September 16 8, 1996 meeting of the Innovative Technology Committee. The meeting started at about 1:05, and ended at about 3:50. Attending were:

Pamela Hall Environmental Business Council - New England

William Daly
Peter McGlew
NH Water Works Association
NH Business & Industry Association

Richard Levergood American Society of Civil Engineers, NH Sec.

Jeffrey MacGillivray NH House of Representatives, Science, Technology & Energy

Committee

Bob Minicucci DES

The meeting started with discussion of the first draft of the report, which was sent out about a week before the meeting. I noted that the draft was not to be used as a DES work product, that it had not been reviewed or approved by DES management. Attendees indicated that they understood this, and also were fairly satisfied with what they've read. The sections on case studies, and the discussion on DES's customers were especially noted as useful. There was general agreement to shorten the section on discussions at IT Committee meetings and place that information in an appendix. The "Summary of Recommendations" section came in for some criticism - while the Committee agreed with the recommendations, the way it was written gave a self-serving appearance. It was pointed out that much of the text was on subjects not covered by the recommendations, and that we should add recommendations to the list. It was indicated that this would help to "sell' the core recommendations.

Some possible additional recommendations were discussed. Making a statement in favor of currently-proposed changes to hazardous waste regulation at the Federal level, such as the Hazardous Waste Identification Rule and the contaminated Media Rule, was generally agreed to, as these changes should help make it easier to use innovative technologies in that field. Another possible recommendation came up during Claire Barker's telephone conference with the Committee, which will be mentioned as part of her portion of the meeting.

I noted that following the two Environmental Business Council seminars that I attended (and spoke at) in early September, I intended to modify the text to upgrade the importance of technology verification.

During the meeting, comments from Ken Kimball at AMC arrived by 'fax. They were fairly detailed, mostly indicating that sections of the text should be briefer. He also noted that the "environment" should get more notice as a DES customer. I'll try to address that, I will try to explain that while the environment can be considered an "ultimate' customer, the customers discussed in detail are there because they are the ones proposing technologies to us. He felt that the report seemed to be slanted towards how to make things better for the business community. I'll keep this in mind as the writing proceeds.

I'd like to add at this point that detailed comments are welcome, right down to spelling and grammar notes. So that the writing can proceed however, please get any comments you have on the first draft to me by **September 27.** Mail them, fax them, e-mail them, call me, I (and DES) want to hear from you.

We briefly discussed the specific authorship and audience of the report. The attendees felt that it was DES's report, and were not interested in having the Committee share author credit. The intended audience is the regulatory community, although I hope to write clearly enough so that other people will be able to understand it.

Representative MacGillivray explained the NH Comparative Risk Project, which he is participating in. Briefly, this is a group working on the question of prioritizing the actual environmental risks faced by New Hampshire, in a broad sense. To keep these minutes at less than novel-length, I recommend contacting Katherine Hartnett, the project manager for that project, or Rep. MacGillivray for more information.

Rep. MacGillivray also asked after the long-term nature of the Committee. I explained Commissioner Varney's vision of a standing committee to advise DES on technology matters, and the reservations that members had previously expressed. Ways to address these reservations could be: limit the number of meetings to a definite number per year, to control the time commitment required; and expressing the Committee's recommendations as "advisory opinions" to limit liability.

At the Committee's request, I had asked Claire Barker, the Massachusetts Department of Environmental Protection's (MADEP) Innovative Technology Coordinator to attend this meeting. She spoke to us and answered questions for about an hour through the speaker-phone. I've attached information on their program that she provided to me before the September 16 meeting. I've got more information on this program if you're interested. In these minutes, I'll try to note items that were of interest to the Committee.

In 1994, the MA Executive Offices of Environmental Affairs and Economic Affairs held a forum on environmental technologies. At this forum it was found that the business environment in MA was not as positive for environmental technology firms as it seemed to be for software or bio-tech firms, two industries that have been successful in MA in recent years. They decided that the Commonwealth of MA should assist small or start-up environmental technology firms, leading to the formation of the Strategic Envirotechnology Partnership (STEP) program, involving the two departments named above and the University of Massachusetts system. MADEP brought regulatory interpretation/expertise and permitting assistance to the program.

Due to a previous permit streamlining project, MADEP staff was feeling more time pressure to evaluate proposals that involved innovative technologies; time deadlines under the streamlining project were seen as not allowing the extra time needed to evaluate an unfamiliar proposal.

A network of advocates - Innovative Technology Coordinators - was established. Two of these are full time. Claire's position in the Commissioner's office is one of these, and has been funded by an EPA grant since April 1995. The other full time person is funded by a fee-supported program in their Bureau of Waste Site Clean-up. The other six people, in each of their five regions and in one other Boston office, do this IT work in addition to their other duties.

There is a second network established, of "Technical Resource" people who have expertise that they're willing to share in each of the areas MADEP works in. I mention this in the context of a Committee question - how were the part-timers selected. They were <u>not</u> selected for technical expertise, as the range of knowledge needed is too great for any one person. Apparently they were selected on the basis of their individual interest in innovative technologies. Each of the coordinators in the regions was tasked to develop a network of technical advisors. Additionally, MADEP has established a database, available to staff, of innovative technology applications in the state.

A Committee member suggested that I could add a recommendation to the report for DES to establish just such a network of technical advisors. A database of applications appears useful to me.

In practice, UMASS is the only part of the STEP partnership funded by the State legislature. Various branches of UMASS provide technical verification of new technologies, and produce a "Technical Assessment Report." Production of this report takes 30 to 60 days. At present, evaluations from application to final report have taken 12 to 15 months. Claire hopes that this can be reduced, soon, to four months. She notes that these time frames assume that government processes are the time-limiting factor, which is not always the case.

About 60% of the applications received to date are in the broad category called "Waste Prevention", which can be generally described as industrial technologies affecting all environmental media. A notable number of these have been for biology-based waste processing technologies for in-plant use. About 20% of the total have been in the field of environmental monitoring. Fewer technologies for waste site clean-up than expected have been received, and most of these are biological.

STEP has been in place for about two years now, which is just about long enough to begin to see if there have been results. They do not have quantifiable data to document the success, if any, of their program. The Committee felt that this was a definite weakness.

I'd like to note that when I e-mailed Claire thanking her for her time, she noted that she had gotten a lot of feedback from private sector parties indicating that they felt the program was useful to them. The reactions she's gotten indicate that it has made a tremendous difference in how technology developers feel about working with MADEP and further that it is beginning a culture shift with MADEP staff to be able to accept innovative technologies.

In other discussions, Rep. MacGillivray noted that there could well be support in the legislature for expanding the application of House Bill 1325 to all DES-regulated matters. He also spent some time discussing a new regulatory system that he has been working on, specifically for some large industries in the field of air pollution. An information package on this program is attached. Rep. MacGillivray is interested in your comments.

The meeting broke up about 3:50. My next step is to re-write the report into sem-final form, so to allow the writing chore to proceed I would appreciate any comments you may have on the draft

# September 27.

The next meeting is scheduled for **Friday**, **October 18 at 1:00 in DES Room 112.** At that meeting we will discuss the report, especially recommendations for future actions.

I can be reached at (603) 271-2941, fax (603) 271-6683, or E-Mail at <u>rpm2@des.state.nh.us</u> if you have questions or comments. See you in October, and thank you for your continued interest.

RPM:eti\91696mtg.min

Attachments: MADEP information

"Industry-Average Performance System for Air pollution Control"

October 29, 1996

To: Members of DES Innovative Technology Committee

Re: Minutes of October 18 1996 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the October 18,1996 meeting of the Innovative Technology Committee. The meeting started at about 1:15, and ended at about 2:50. Attending were:

William Daly NH Water Works Association Taylor Eighmy University of New Hampshire

Kenneth Kimball Appalachian Mountain Club [attending by telephone]
Carol Kilbride USEPA Region I, Center for Environmental Industry &

**Technology** 

Bob Minicucci DES

Carol Kilbride started the meeting with a description of the Center for Environmental Industry & Technology (CEIT) at Region I. CEIT was established by Regional Administrator DeVillars to assist New England's environmental-related businesses. CEIT assists businesses as an information broker or clearinghouse, by offering tangible assistance to developers of environmental technology when possible, and by trying to ensure that the regulatory system itself is not placing unnecessary barriers to technology developers. CEIT has a wide range of contacts in technology development, verification, history of uses, and regulatory matters. CEIT has been a leading party in establishing the new Interstate Regulatory Cooperation Project, which involves the New England states in coordinated technical review of new technologies in on-site wastewater disposal. CEIT is funding this DES "Barriers" project. CEIT can be reached at 1-800-575-CEIT (2348). At the national level, CEIT is a part of EPA's Environmental Technology Initiative. Carol reported that this Initiative has had its funding cut radically. I have attached some CEIT newsletters to these minutes for your information.

Discussion then moved on to the report on "Barriers to Innovative Technologies." Discussion focussed on the augmented list of Recommendations, which now includes 11 Recommendations. An excerpt of the draft report containing these recommendations is attached, as is a partial first draft of Chapter 6 "Solutions to These Barriers." In these minutes, I will refer to the recommendations by number.

In the legislation recommended in #1, it was noted that proper checks and balances will be needed. Also, caution in expanding a new and untried program was urged.

It was noted that implementing #4 (internal expert network) may be a necessary pre-requisite to implementing #3 (allowing greater professional judgement by DES).

#9 relates to funding replacement projects, especially for municipalities. Such a program existed under the Clean Water Act, but has lapsed; this brought out the obvious question, why did it lapse, was it a bad program. Carol Kilbride said that it was due to the change in that program from grants to loans from state revolving funds. This particular recommendation got some approving comments, especially for new technologies. It was noted that such a "replacement" program doesn't have to be limited to grants, many means can achieve the needed goal. "Soft landing" enforcement policies, where problems associated with start-up are not treated with full enforcement are one option. Supplemental Environmental Projects, a concept used in enforcement of waste management regulations, are a useful legal/regulatory tool to achieve equivalent environmental gain where earlier work has not achieved that gain.

The Fall, 1996 edition of "Small Flows," by the Small Flows Clearinghouse at the University of West Virginia, has an article on the old Clean Water Act program. A study of the effects of that program was funded through EPA's Environmental Technology Initiative. See page 9 of the newsletter, or visit www.nsfc.wvu.edu. It was also mentioned that a sister organization of the Small Flows Clearinghouse, the National Drinking Water Clearinghouse, has an existing database of innovative technologies. It so happens that this effort is administered by the US Department of Agriculture.

Other comments included: #8 needs additional specificity; #7 should emphasize Federal and regional government efforts more and that professional either can or do produce these databases; #6 got approving votes. While #9 is useful to improve a municipality's comfort level with a truly new technology, #7 would be used to improve their comfort level with an existing, but unfamiliar, technology.

For all recommendations, additional information will be included in what is now envisioned to be Chapter 7 of the report. How each recommendation would work in practice will have to be described.

There was some discussion on the overall tone of the report. Our UNH member apparently felt quite strongly that the report as currently drafted was too focussed on what DES was doing wrong; that in his experience (and he is often called by DES for assistance in these matters) the core problem is the lack of data from outside parties documenting the performance of an innovative system. These statements generated some interesting discussions. The explicit point of this report is to examine DES's own practices. State regulators do not always adequately understand the data that they are given. Two members felt that we should be putting more onus on the applying party.

As discussions progressed, it was noted that the type or form of an approval should consider the technology being approved, and whether the technology is truly new or an old technology with a new use. Research & Development permits [defined in the Solid Waste rules] could be used more widely. Terms and conditions on the amount and quality of performance data can be included.

It was noted that the case studies considered form a limited universe, therefore they should not be the sole basis for recommendations.

Carol asked about the model approval process for new technologies that is part of the grant work plan. I said that #1 (expanding RSA 125-C) was intended to meet this requirement. I will have to include language explaining this. Language may also be needed on permitting pathways for innovative technologies, including R&D permits, "soft landing" enforcement strategies, etc.

The number of people attending the meeting was noted. I said that this was about the number of people that ordinarily attend. I mentioned several things in that context. First, in response to public demand for relief from onerous regulatory requirements, the "Enhanced Environmental Performance" language was added to RSA 125-C. Since that came into effect (July 1, 1996) exactly no one has applied for such an agreement. Attendance at the IT Committee meetings has been low. Publicity in member organization newsletters, trade and public press has generated little or no input to DES on the subject of regulatory barriers. It is beginning to appear that the level of complaint may not be truly proportional to the actual problem. The first draft of Chapter 6 (attached) reflects this tentative conclusion. Having said that, no one will claim that DES is perfect. Rather, the focus is shifting to finding solutions to smaller-scale problems, that will offer incremental improvement rather than radical change.

I'd also like to report that the poster presentation on this project at the 11th Annual Contaminated Soils Conference at UMass in Amherst last week went well, but it did not seem to generate any heat.

The next step is to complete the report in "semi-final" form. This semi-final report will be distributed to the IT Committee for comment in mid-December. I expect to schedule another meeting in early January, at which point the report will be finalized.

Thank you for your continued attention. I can be reached at (603) 271-2941 or E-Mail at rpm2@des.state.nh.us. Your comments are welcome at any time.

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Attachments: Excerpts of Draft Report

**CEIT Newsletters** 

Brochure for Interstate Regulatory Cooperation Project

cc: Robert W. Varney, DES

DES Division Directors, w/Att

Carol Kilbride, USEPA New England, CEIT

January 21, 1997

To: Members of DES Innovative Technology Committee

Re: Minutes of January 20, 1997 Innovative Technology Committee meeting

From: Bob Minicucci, DES Innovative Technology Coordinator

This memo serves to record the discussions at the January 20, 1997 meeting of the Innovative Technology Committee. The meeting started at about 1:10, and ended at about 2:00. Attending were:

Jeffrey Klaiber NH Business & Industry Association

Pam Hall Environmental Business Council [attending by telephone]

Bob Minicucci DES

I started the meeting by apologizing for scheduling it on a holiday. I'm afraid that when I was reserving the room space, I simply forgot that January 20 was a holiday.

Discussion then moved on to the report on "Barriers to Innovative Technologies." Discussion focussed on the Executive Summary and the list of Recommendations. The Environmental Business Council (EBC) recommended that the Executive Summary be expanded to two pages to flesh out discussion of the recommendations in the Executive Summary, understanding that many people who get the report won't read beyond the Executive Summary. They recommended highlighting the following points:

- establishing a single point of contact at DES;
- establishing a database of innovative technologies and their applications;
- increasing inter-state cooperative efforts; and
- expanding the application of 1996 House Bill 1325.

The Business & Industry Association (BIA) representative generally seconded these comments. The report was generally approved.

Distribution of the report was briefly discussed. The interstate regulatory organizations, NEWMOA, NEIWPCC, and NESCAUM, will get copies, as will the member organizations of the DES IT Committee. EBC asked for 20 copies, one for each member company. Regarding presentation of the results of this project, I have already been asked by the BIA and the Water Environment Foundation to present the project. EBC expressed an interest in a presentation at one of their monthly Monday afternoon meetings in Boston. This can be arranged.

The role of the IT Committee over the long term was then discussed. Those present were supportive of the idea. Quarterly meetings may be appropriate. We need some new members, when canvassing for these new members, we should take advantage of the chance to get representation from industry sectors that have not been well-represented so far.

I outlined DES' current thoughts on implementing the recommendations in the draft report, which are as follows:

- 1. "Continue to Support Innovative..." Get publicity to the fact that DES is in fact supportive of innovations (in "DES NEWS"?). This would both reassure staff they can successfully support innovations and let the regulated community know that DES is open to new ideas.
- 2. "Provide new or augmented services..." The Water Division sees this as a contribution to DES's non-regulatory programs, partnering with the P2 program in the Waste Management and the Small Business Ombudsman in the Air Resources Division. Relationships between these

programs may need to be formalized, regular meetings will be needed. Funding is a key question. The existence of a point person for innovative technologies is seen by the IT Committee as being very important, and needs publicizing.

- 3. "Secure flexibility in application of Federal programs..." DES feels that this is a job for program-specific personnel.
- 4. "Improve the State rule-making process..." This is a difficult subject. There are widely differing opinions within DES as to whether this should be included at all, or what priority it deserves. The EBC and BIA representatives offered assistance with this process possibly by lobbying.
- 5. "Staff training..." Work can start on this immediately. We propose to start by working with UNH to get training in Concord. The training needs of the various bureaus would have to be determined first. A seminar for staff to inform them of resources available was suggested by EBC.
- 6. "Change federal hazardous waste regulations..." Probably a job for program-specific personnel.
- 7. "Hire outside experts on an ad hoc basis..." DES actually did this following the dam failure in Alton last year, but that was a bona fide emergency so it may not be an applicable example. Basically, we'll try this option when we need to. DES will publicize this willingness along with No. 1. If and when this scenario is used, the applicant will pay. It was suggested that the existing IT Committee could serve to review work by these ad hoc consultants.
- 8. "Continue Interstate cooperative efforts..." This takes staff time. As an example, my work on the New England Interstate project for septic systems takes a bit more than 2 days per month. That project is going well, and the New England Governors' Conference may expand it soon, probably either into hazardous waste site cleanup or drinking water technology. The Memorandum of Agreement that Massachusetts has entered into with Illinois, Pennsylvania, etc. on technology verification was discussed.
- 9. "Establish network of internal experts..." Work can start on this immediately. A referral system needs to be built, with attendant administrative details. The EBC representative noted that her firm uses a similar list internally to ensure that everyone's skills and backgrounds are known, so they can be used appropriately.
- 10. "Retain the existing IT Committee..." Discussed above. Administrative details may need additional work.
- 11. "Establish or use a technology database..." DES would like to get involved with the new effort by EPA's Environmental Technology Verification program. They have contracted with the Civil Engineering Research Foundation (CERF) to make a database of environmental technologies. CERF has similar databases in the field of highway construction and general civil engineering. The work of making this newer database is just starting, so DES may be able to have meaningful input to the process.

And with that, the meeting ended. The next step is to get final management approval of implementation steps, expand the executive summary, fix minor typo's, and go to print. I expect to be

distributing the report in February 1997. Based on a quarterly meeting schedule, the next meeting of the IT Committee will probably be in April of 1997.

Thank you all for your help in this project. I can be reached at (603) 271-2941 or E-mail at rpm2@des.state.nh.us. Your comments are welcome at any time.

RPM:eti\12097mt.min
cc: Robert W. Varney, DES
G. Dana Bisbee, DES
DES Division Directors
Carol Kilbride, USEPA New England, CEIT

#### APPENDIX D

## 1996 NH House Bill 1325

7march96..... 5100h 05/21/96.....6062L-EBA

# CHAPTER 230 HOUSE BILL - FINAL VERSION

3893L 96-2510 05/09

HB 1325
STATE OF NEW HAMPSHIRE
In the year of Our Lord
One Thousand Nine Hundred and Ninety-Six
AN ACT

relative to the emissions reduction trading programs and establishing a voluntary pilot program on enhanced environmental performance agreements.

Be it Enacted by the Senate and House of Representatives in General Court convened:

230:1 New Section; Enhanced Environmental Performance Agreements. Amend RSA 125-C by inserting after section 6 the following new section:

125-C:6-a Enhanced Environmental Performance Agreements.

I. It is the purpose of this section to create a voluntary pilot program by which the commissioner of environmental services may enter into enhanced environmental performance agreements (EEPAs) with persons regulated under this chapter to implement innovative environmental measures not otherwise recognized or allowed under existing laws and rules of this tate, if those measures achieve emissions reductions or reductions in discharges or wastes ehich equal or exceed those required under applicable statutes and rules, and to test innovative strategies for achieving enhanced environmental results. Approaches embodied in EEPAs should typically represent, favor, or promote pollution prevention, source reduction, environmental innovation, and transferability to other applicable entities, without

increasing the overall level of pollution emitted directly or indirectly to the air, water, and land.

- II. After notice and opportunity for public comment and hearing, the commissioner may enter into enhanced environmental performance aggreements with any person regulated under any or all of RSA 125-C, RSA 125-D, RSA 125-I, RSA 125-J, or RSA 125-K to implement innovative environmental measures that relate to provisions of these chapters, even if one or more of the terms of such an agreement would be inconsistent with an otherwise applicable statute or rule of this state. Participation in this program is limited to those persons who have submitted an enhanced environmental performance agreement that is acceptable to the commissioner. A decision by the commissioner to not enter into an agreement with any person is not appealable.
- III. An enhanced environmental performance aggreement shall operate in lieu of existing permits identified in the agreement. Any environmental statute, regulation, or condition in an existing permit that differs from a term or condition in an agreement shall cease to apply from the effective date of an initial or renewed agreement until the agreement is terminated or expires.
- IV. Persons applying to the commissioner for enhanced environmental performance agreements shall, at a minimum:
  - (a) Submit a description of how the proposal is consistent with the purpose of this section and federal guidelines, and a comprehensive description of the proposed EEPA which includes the nature of the facility, the operations which will be affected, how such operations will be altered to achieve superior emissions reductions, and the extent of emissions reduction anticipated.
  - (b) Include in EEPA proposals the following, without limitation:
    - (1) Identification of all state and federal statutes, rules and regulations applicable to the source.
    - (2) Identification of all statutes, rules and regulations that are inconsistent with one or more terms of the proposed agreement.
    - (3) A statement describing how the proposed aggreement will achieve the purposes of this section.
    - (4) A statement describing the implementation of the proposed agreement, including a list of steps and schedule. Implementation of the proposed agreement shall not increase overall worker safety risks or create undue risk burdens on others.
    - (5) Identification of those members of the general public, representatives of local communities, environmental groups, and other appropriate parties who have participated in the development of the proposed agreement or who have an interest in the agreement.
    - (6) Identification of how the applicant will demonstrate ongoing satisfaction of the requirements of the agreement, including but not limited to, mechanisms for performance assurance and the type of performance guarantees to be provided, which guarantees shall be directly related to the complexity of, and risk associated with, the proposal.
    - (7) A description of and plan for public participation in the EEPA.
    - (8) A schedule for review by the commissioner of the performance of the proposed EEPA.

- (9) Provisions for voluntary and involuntary termination of the agreement.
- V. Without limiting the commissioner's authority under this section to specify additional criteria, the commissioner may adopt rules, under RSA 541-A, specifying criteria for acceptance of proposed enhanced environmental performance agreements.
- VI. In the event of deficient performance of any term or conditionin the agreement, the commissioner may, with written notice, terminate any agreement, and the participant shall then be subject to enforcement under the applicable chapter. The commissioner's decision to terminate an agreement is not appealable. If an agreement is terminated, the participant shall have 30 days to apply for any necessary permits concerning operations that were in effect during the course of the agreement.
- VII. Nothing in this section shall limit the authority or the ability of the attorney general to initiate enforcement action against a person for violation of any laws of this state or rules adopted under such laws, except that an enhanced environmental performance agreement shall be deemed to be a permit to engage in activities authorized under the agreement.
- VIII. Nothing in this section shall reduce, eliminate, or in any way affect any fees that a participant in this program may be required to pay under any federal or state law. Applicants for participation in the enhanced environmental performance agreements program shall pay all costs associated with public notice and hearings.
- 230:2 Chapter Heading Changed. Amend the chapter heading of RSA 125-J to read as follows:

# CHAPTER 125-J EMISSIONS REDUCTION [CREDITS] TRADING [PROGRAM] PROGRAMS

- 230:3 New Paragraph; Discrete Emission Reduction. Amend RSA 125-J:1 by inserting after paragraph XI the following new paragraph:
- XI-a. "Discrete emission reduction" or "DER" means an emission reduction generated over a discrete period of time, and measured in weight (e.g., tons).
- 230:4 New Paragraph; Emission Budget. Amend RSA 125-J:1 by inserting after paragraph XII the following new paragraph:
- XII-a. "Emission budget" or "budget" means the numerical result in tons per season of NOx emissions which results from the application of the emission reduction requirement of the ozone transport commission memorandum of understanding dated September 27, 1994, and which is the maximum amount of NOx emissions which may be released from the budget sources collectively during a given control period.
- 230:5 New Paragraphs; NOx Budget Allowance; NOx Budge Source. Amend RSA 125-J:l by inserting after paragraph XIX the following new paragraphs:
- XIX-a. "NOx budget allowance" means the limited authorization to emit one ton of NOx during a specified control period. All NOx budget allowances shall be allocated, transferred, or used as whole NOx budget allowances. To determine the number of whole allowances, the number of NOx budget

allowances shall be rounded down for decimals less 0.50 and rounded up for decimals of 0.50 or greater.

XIX-b. "NOx budget source" means a fossil fuel fired boiler or indirect heat exchanger with a maximum rated heat input capacity of 250 MMBtu/Hour, or more; and all electric generating facilities with a reted output of 15 MW, or more. Any person who applies to opt into the NOx budget program shall be considered a NOx budget source upon the acceptance of the application for opt-in.

230:6 New Section; Authority to Establish Trading and Bank Programs. Amend RSA 125-J by inserting after section 2 the following new section:

125-J:2-a Trading and Bank Programs. The divisionmay establish trading and bank programs regarding discrete emissions reductions, Nox budget allowances, or other emissions reduction credit mechanisms to facilitate compliance with the requirements of the Clean Air Act.

230:7 New Section; Escrow Authority. Amend RSA 125-J by inserting after section 3 the following new section:

125-J:3-a Escrow Authority. The commissioner may accept payments to be held in an escrow account to be used for the purchase of emissions reduction credits, discrete emissions reduction credits, Nox budget allowances, and other emissions reduction credit mechanism until such time as credits, allowances or other mechanisms are available for trading or banking in a trading or banking program.

230:8 New Section; Registration of Emissions Reduction Mechanisms. Amend RSA 125-J by inserting after section 4 the following new section:

125-J:4-a Registration of Emissions Reduction Mechanisms. The department may also establish and administer a process for the registration, revocation, and enforcement of discrete emission reductions, NOx budget allowances, and all other emissions reduction mechanisms for any air pollutants in accordance with the Clean Air Act. The use of DERs, NOx budget allowances and other emissions reduction mechanisms shall be permitted as approved by EPA and in accordance with rules adpoted by the commissioner pursuant to this chapter.

230:9 New Section; Escrow Authority. Amend RSA 125-J by inserting after section 11 the following new section:

125-J:ll-a Escrow Authority.

I. The commissioner, in consultation with the treasure of the state of New Hampshire, may establish non-interest-bearing escrow accounts to facilitate the acquisition of ERCs, DERs, and other emissions reduction mechanisms. The commissioner shall maintain and publish, on or before January 1 and July 1 of each year, a list of all escrow accounts established, the balance of tons of each account, and the amounts of moneys held within each account.

II. Escrow accounts may be used to satisfy the portion of any offset requirement that exceeds a ratio of 1:1 but shall not be used to satisfy the portion of any requirement which is less than or equal to 1:1. Escrow accounts may also be used to satisfy past-due RACT requirements, but the balance, in tons, in any such escrow account shall annually decrease by at least 20 percent of the original amount through the purchase or other emissions reduction mechanisms. The balance of any such escrow account shall be kept in tons, and the balance of each such account shall be increased by one percent at the end of each

month.

III. The establishment, maintenance, operation, and termination of such escrow accounts shall be permitted in accordance with rules adopted by the commissioner pursuant to this chapter. The commissioner shall require that, at the end of each month, money shall be held within each such escrow account equal to at least 110 percent of the current market price per ton of ERCs, DERs, or other emissions reduction mechanisms times the balance, in tons, of that escrow account. Current market prices shall be determined by the commissioner.

230:10 New Subparagraph; Rulemaking Authority Amended. Amend RSA 125-J:12, I by inserting after subparagraph (g) the following new subparagraph:

(h) Procedures for implementing trading and banking all emissions reduction credit mechanisms.

230:11 Date Changed; Rulemaking Authority; Submission. Amend the introductory paragraph of RSA 125-J:12, I to read as follows:

I. Notwithstanding RSA 541-A, the commissioner shall adopt special temporary rules not subject to RSA 541-A as expeditiously as possible after (the effective date of this chapter] *July 1, 1996*, except that the department shall hold a public hearing on the proposed special temporary rules and shall provide the public with notice of the hearing and an opportunity to testify and comment in writing, in accordance with the terms of the notice. The commissioner shall submit proposed rules pursuant to RSA 541-A no later than June 30, (1996] *1997*. Such temporary and permanent rules shall include, but not be limited to, the following:

230:12 Authority to Establish Trading and Bank Programs. Amend RSA-125-J:2-a to read as follows:

125-J:2-a Trading and Bank Programs. The (division) *department* may establish trading and bank programs regarding discrete emissions reductions, NOx budget allowances, or other emissions reduction credit mechanisms to facilitate compliance with the requirements of the Clean Air Act.

230:13 Contingency. If HB 1314 of the 1996 regular session becomes law, section 12 of this act shall take effect July 1, 1996, at 12:01 a.m. If HB 1314 does not become law, section 12 of this act shall not take effect.

230:14 Effective Date.

- I. Section 12 of this act shall take effect as provided in section 13 of this act.
- II. The remainder of this act shall take effect July 1, 1996.

Approved: June 10, 1996

Effective: I. Section 12 shall take effect as provided in section 13 of this act.

II. The remainder shall take effect July 1, 1996.

#### APPENDIX E

## Sources of Information on Innovative Environmental Technologies

This list is intended to help people who need information on developing, commercializing, or getting approval of environmental technologies. This list is not exhaustive. It will mostly serve to begin to indicate the breadth of available information. Any of these resources may be able to refer you to other resources, if they can not offer the desired services. The internet in general, and the world-wide-web in particular, are very useful tools for research and to find people and resources in any field.

## **Government Documents**

INNOVATIVE HAZARDOUS WASTE TREATMENT TECHNOLOGIES: A Developer's Guide to Support Services, Third Edition, EPA/542-B-94-012, US EPA Office of Solid Waste & Emergency Response, September 1994.

A guide to regulatory requirements, domestic and international assistance programs, technology incubators, and evaluation and research resources at universities and government facilities. Available from:

US EPA/NCEPI PO Box 42419 Cincinnati, OH 45242-0419 (513) 489-8190, fax (513) 891-6685

FROM INVENTION TO INNOVATION: Commercialization of New Technology by Independent Small Business Inventors, US Department of Energy, May 15, 1991

The Department of Energy (DOE) supports the development of new technologies that are either energy related in any way, including those that promise to use less energy, or those that appear useful to DOE to address their own environmental problems. This book outlines the technical, financial, legal and business processes that an inventor must go through to commercialize her or his work. Available from the Department of Energy. Their New England office can be reached at:

(617) 565-9715

Federal Laboratory Consortium for Technology Transfer Northeast Region Directory

This document lists resources at federal facilities operated by the Departments of Agriculture, Commerce, Defense, and Transportation, as well as State agencies and other service providers. All the Federal facilities have a person in charge of technology transfer, and have established procedures to enter into "Cooperative Research and Development Agreements" (CRADA's) quickly and efficiently to allow a technology developer to use the considerable resources of the Federal laboratory system. Contact:

Dorry Tooker, Regional Coordinator NE Region, Federal Laboratory Consortium Brookhaven National Laboratory Building 902-C Upton, NY 11973 (516) 282-2078, Fax: (516) 282-3729

E-mail: Dorry@bnl.gov

## **Other Federal Agencies and Programs**

U.S. Environmental Protection Agency, Washington, DC

Many branches of EPA are working on development of new technologies, including:

Office of Research & Development Office of Air Quality Planning & Standards, Technology Transfer Network

Contact USEPA in Washington, DC or try their internet address: www.epa.gov

EPA also maintains several computerized bulletin boards and databases. Contact (on the internet): www.epa.gov/attic. This page offers access to several databases in the field of contaminated site investigation and cleanup.

Strategic Environmental Research and Development Program

This is a cooperative inter-agency effort to develop new technologies which is run by EPA, and the Departments of Defense and Energy. Contact:

SERDP Program Office 901 N. Stuart Street, Suite 303 Arlington, VA 22203 (703) 696-2117 fax: (703) 696-2114

Internet address: <a href="http://www.hgl.com/serdp/">http://www.hgl.com/serdp/</a>

USEPA Region I, New England, Center for Environmental Industry & Technology

The Center for Environmental Industry & Technology (CEIT) assists businesses as an information broker or clearinghouse, by offering tangible assistance to developers of environmental technology when possible, and by trying to ensure that the regulatory system itself is not placing unnecessary barriers to technology developers. CEIT has a wide range of contacts in technology development, verification, history of uses, and regulatory matters. Contact:

USEPA Region I, New England CEIT One Congress Street Boston, MA 02203 (800) 575-CEIT Fax: (617) 565-4939

Internet address: <a href="http://www.epa.gov/region01/steward/ceit">http://www.epa.gov/region01/steward/ceit</a>

NASA Regional Technology Transfer Center

Not just for rocket science, NASA understands the process of development and commercialization of new technologies very well. Contact:

NASA CTC PO Box 6360

505 Amherst Street Nashua, NH 03063-6360

(603) 598-8800 Fax: (603) 598-9830

## **State Resources**

NH Department of Environmental Services

Small Business Ombudsman (603) 271-1370 Pollution Prevention Program (603) 271-6398 Innovative Technology Program (603) 271-2941

NH Department of Resources and Economic Development

Business and Economic Development Office (603) 271-591

Massachusetts Strategic Environmental Partnership

See the discussion in Section 5.3 of this report. Contact:

David Lutes Environmental Technology Industry Specialist MA Office of Business Development (617) 727-3206 Fax: (617) 727-8797

Center for Clean Industrial and Treatment Technologies (CenCITT).

This is included both because it may be useful, and to show that many states have similar resources.

Michigan Technological University 1400 Townsend Drive Houghton, MI 49931 (906) 487-2798 Fax: (906) 487-3292

# **Other Agencies**

The National Small Flows Clearinghouse The National Drinking Water Clearinghouse

These offices, located at the University of West Virginia, offer services and information on small wastewater and drinking water systems, respectively. They also offer computerized bulletin board services. Contact:

[Name of clearinghouse] West Virginia University PO Box 6064 Morgantown, WV 26506-6064 (800) 624-8301

Internet Addresses: <a href="http://www.estd.wvu.edu/nsfc">http://www.estd.wvu.edu/ndwc</a>

#### NSF International

Formerly known as the National Sanitation Foundation, NSF International establishes product standards and conducts technology verification services, including on-going monitoring of a product/vendor's compliance with the standard. Fields covered include: residential wastewater and drinking water treatment and related products, plastic piping materials, and food-related sanitation. Contact:

NSF International PO Box 130140 Ann Arbor, MI 48113-0140 (800) 673-6275 Fax: (313) 769-0109

Internet: www.nsf.org

The Civil Engineering Research Foundation

The Civil Engineering Research Foundation (CERF), affiliated with the American Society of Civil Engineers, serves to coordinate and facilitate research in all branches of civil engineering. In late 1996, CERF was awarded a grant by the Environmental Technology Verification program run by USEPA, Office of Research & Development, to make a database of environmental technologies. CERF currently maintains databases of technology in highway construction and in general civil engineering. Contact:

#### **CERF**

1015 15th Street NW, Suite 600 Washington, DC 20005-2605 (202) 842-0555 Fax: (202) 789-2943

Internet: http://www.cerf.org

Rice University, Advanced Applied Technology Demonstration Facility

A program working with the US Department of Defense to demonstrate performance and assist commercialization of technologies in the field of hazardous waste site cleanup. Contact:

AATDF, Rice University 6100 S. Main Street Houston, Texas, 77005-1892 (713) 527-4700 Fax: (713) 285-5948

E-mail: aatdf@ruf.rice.edu

Battelle Memorial Institute, Environmental Systems and Technology Division

The Battelle Institute is involved with environmental technology development. Contact:

Battelle Memorial Institute 505 King Avenue Columbus, OH 43201 (614) 424-6424 Fax: (614) 424-3704

E-mail: info@estd.battelle.org

website: http://www.estd.battelle.org

website. http://www.esta.batterie.org

## GNET Technology Database

An information service by the US Department of Energy, focussing on the work of DOE's national laboratories.

website: www.gnet.org

California Environmental Technology Center

An information service run by the University of California a San Diego, Scripps Oceanographic Institute. Contact:

California Environmental Technology center Scripps Institute of Oceanography 9500 Gilman Drive, 0241 LaJolla, CA 92093-0241 (619) 534-8400 Fax: (619) 534-8270

E-mail: cetc@sio.ucsd.edu

website: <a href="http://www-sio.ucsd.edu/sp\_progs/cetc">http://www-sio.ucsd.edu/sp\_progs/cetc</a>

The University of New Hampshire

Conducts research and technology verification. Specialities include small drinking water and wastewater systems, contaminated site cleanup, pollution prevention, and technologies in the estuarine environment.

Environmental Research Group (603) 862-2206 Industrial Research Center (603) 862-0123

University of Connecticut, Environmental Research Institute

Conducts research and technology verification. Contact:

UConn ERI, Longley Building Route 44, U-210 Storrs, CT 06269-3210 (203) 486-4015 Fax: (203) 486-5488

website: http://www.eng2.uconn.edu/eri

#### Other

NH Manufacturing Extension

Affiliated with the NH Technical Colleges. Contact:

(603) 598-8800

Manchester Manufacturing Management Center

Affiliated with the University of New Hampshire's Industrial Research Center. Contact:

(603) 625-0106

- 1. Castaing, Francois J. How to Stifle Innovation Technology Review, May/June 1995
- 2. Western Governor's Association, Federal Advisory Committee to Develop On-Site Innovative Technologies *Regulatory Barriers Roundtable* San Francisco, CA, October 20, 1993

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